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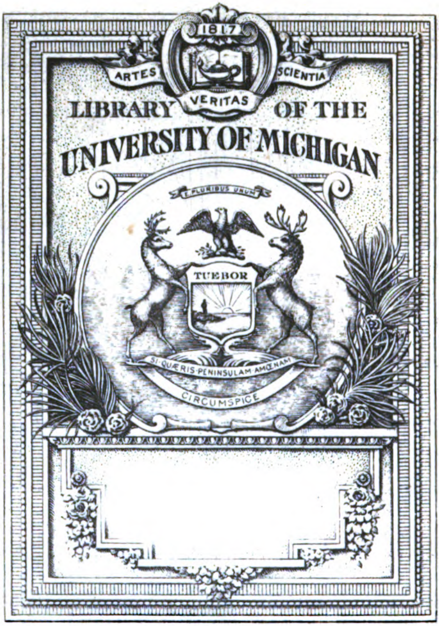
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THE
Gentleman's Diary,
OR THE
MATHEMATICAL REPOSITORY;
An ALMANACK
For the YEAR of our LORD 1760.

BEING
BISSEXTILE, or LEAP-YEAR.

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—— Quâ causâ argentea Phœbe
Paſſibus haud æquis graditur; cur ſubdita nulli
Hactenus Aſtronomo numerorum fræna recuſat:
Cur remeant Nodi, curque Auges progrediuntur.
—— Quantis refluum vaga Cynthia pontum
Viribus impellit; dum fractis fluctibus ulvam
Deſerit, ac Nautis ſuſpectas nudat arenas,
Alternis vicibus ſuprema ad littora pulſans.

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THE GEOGRAPHY OF THE GREAT SOLAR ECLIPSE of the *Penumbra* over the Earth, on *Sunday April* 1, 1764.

Hist. of science
Bowle
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CONTAINING,

A PROJECTION of that Part of the Earth's *Surface*, to whoſe Inhabitants the Eclipſe will be viſible; upon which Curves are drawn, ſhewing the *Beginning*, *Middle*, and *End* of the ECLIPSE, at Sun Riſing and Setting: The *Path* of the *Central* Shadow; the *Penumbra's* Expanſion; and the Digits eclipſed at any *Place*. Alſo are ſhewn the Digits eclipſed at Sun *Riſing* and *Setting*, at thoſe Places where the *greateſt* Obſcuration happens before Sun *Riſing*, and after Sun *Setting*. But, what is ſtill more curious, the Time of the *Middle* of the ECLIPSE, as well as the Quantity of the *greateſt* OBSCURATION, may be known by this PROJECTION to the utmoſt TRUTH, by little more than *bare Inſpection*; which will be illuſtrated by an EXAMPLE. Beſides which, this WORK will be further illuſtrated with TYPES for the moſt remarkable Places.

By JOHN TODD Exciſe-Officer at *Tythby*, in *Nottinghamſhire*.

(Price Two Shillings, plain.)

THOSE who are pleaſed to encourage this WORK, are deſired to ſend their Names to the AUTHOR, at *Tythby*, where the Original may be ſeen: Or, to THOMAS PEAT, Writing-Maſter, Accomptant, and Surveyor, in *Nottingham*, by whom the *Prints* will be delivered to SUBSCRIBERS.

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To the PUBLICK.

ALL Perſons who are pleaſed to be *Contributors* to this DIARY, by anſwering the *Queſtions*, *Ænigmas*, &c. or by ſending in new ones, or other *Subjects* proper for the WORK, are deſired to ſend *them* and their *Solutions* along with them, before the firſt Day of *May* 1759, directed for the Authors of the GENTLEMAN'S DIARY; to be left with THO. PEAT, School-maſter in *Cartergate*, NOTTINGHAM; and no where elſe (poſt paid, or they will not be received.)

JANUARY hath XXXI Days.

M D	☉ Decl. South.	
1	23°	3′
6	22	33
11	21	52
16	24	00
21	19	58
26	18	47

		Day at	
Full Moon	the 2d		2 min. paſt 5 Afternoon
Laſt Quarter	the 10th		42 min. paſt 5 Morn.
New Moon	the 18th		31 min. paſt 6 Morn.
Firſt Quarter	the 25th		40 min. paſt 7 Morn.

1	Tu	Circumciſion. New Year's Day.	6M 40	11 A 16
2	W	*Expect* Weather *to be this Year, nearly*	☽ Riſes	Morn.
3	Th	*ſuch, or ſuch like, as in ſome former Years.*	4 A 47	17
4	F	Days increaſed about a Quart. of H.	5 59	1 17
5	S	OLD CRISTMAS-DAY.	7 15	2 12
6	F	Epiphany, CHRIST's ✳ app. to Gen.	8 32	3 3
7	M	(*Saliſbury*, Wiltſhire the 6th)	9 41	3 49
8	Tu	Lucian, Prieſt & M.	10 50	4 33
9	W	*Canterbury.*	11 59	5 15
10	Th		Morn	5 56
11	F	Days increaſed 26 minutes.	1 6	6 36
12	S	OLD NEW-YEARS DAY.	2 12	7 17
13	F	1 Sunday after Epiphany.	3 19	8 0
14	M	(*Preſton*, Lanc. the 13th)	4 27	8 46
15	Tu	*Barſton*, Yorkſhire.	5 35	9 35
16	W	*Hickford*, Lanc. Day 8 hours 20 m. l.	6 38	10 27
17	Th	*Taviſtock*, Devonſhire.	7 33	11 20
18	F	Priſca, Rom. V. & M. *Nottingham.*	☽ Sets	0 A 14
19	S	In eight Days of St. Hillary. (20)	5 A 27	1 8
20	F	2 Sunday after Epiphany.	6 47	2 0
21	M	Agnes, Rom. V. & M. *Briſtol.*	8 6	2 50
22	Tu	Pint. Span. Deac. M.	9 25	3 40
23	W	Term begins.	10 46	4 29
24	Th	CH. FRED. K. of *Pruſſia* born 1712	Morn.	5 18
25	F	Conv. of St. PAUL.	7	6 8
26	S	From the Day in St. Hil. on 15 D. (27)	1 29	7 0
27	F	3 Sunday after Epiphany.	2 51	7 55
28	M	Days increas'd an hour and 10 min.	4 12	8 54
29	Tu	*Grampound*, Cornwall.	5 27	9 54
30	W	K. Charles Mart. at *Whitehall*.	6 30	10 53
31	Th	12 min. paſt 1, 1649.	7 19	11 48

D	☉ Riſes	☉ Sets	♄ Sets	♃ Sets	♂ Riſes	♀ Riſes	☿ Sets	Cl. bef. ☉
1	8h 4′	3h 56′	9A 23	5 A 28	10A 21	4 M 0	4 A 36	4′ 1″
6	8 1	3 59	9 4	5 13	10 5	4 4	Riſes	6 18
11	7 56	4 4	8 45	4 58	9 49	4 9	6 M 39	8 25
16	7 50	4 10	8 26	4 43	9 33	4 15	6 17	10 17
21	7 44	4 16	8 8	Riſes	9 15	4 21	6 10	11 50
26	7 36	4 24	7 50	7 M 38	8 54	4 29	6 11	13 5

FEBRUARY hath xxix Days.

M D	☉ Decl. South.
1	17° 11′
6	15 42
11	14 6
16	12 25
21	10 39
26	8 40

Full Moon the 1ſt } Day at { 32 min. paſt 6 Morn.
Laſt Quarter the 9th } Day at { 18 min. paſt 3 Morn.
New Moon the 16th } Day at { half paſt 8 at Night.
Firſt Quarter the 23d } Day at { 26 min. paſt 6 Afternoon

M D	W D	Sundays, Holy and Remarkable Days, Length. incr. Days Terms, Fairs, &c.	☽ Riſes & Sets.	Moon South.
1	F	Day 9 hours 8 min. long. (*Faſt.*	4 A 42	Morn
2	S	Purification V. M. Candlemas Day.	6 0	0 42
3	F	Septuageſima Sunday. Blaſius Bp.	7 13	1 32
4	M	On the Mor. of the Purif. B.V.M. (3)	8 25	2 18
5	Tu	**Agatha** Sicil V. & M. *Graveſend*, K.	9 34	3 [illegible]
6	W	Days are now increaſed, and the	10 43	3 42
7	Th	Nights ſhortened 1 Hour & 46 min.	11 50	4 23
8	F	*Bingham*, in the Vale of *Belvoir*, Not.	Morn.	5 6
9	S	In eight Days of the Purif. B. V. M.	0 58	5 48
10	F	Sexageſima Sunday.	5	6 32
11	M	*Llanduſſel*, Monm.	13	7 20
12	Tu	Term ends.	4 20	8 10
13	W	Old Candlemas-Day. *Dorcheſter.*	5 18	9 3
14	Th	**Valentine**, Biſh. and M. *Flint.*	6 9	9 58
15	F	Days begin to lengthen a pace,	6 56	10 53
16	S	getting 4 minutes every Day.	☽ Sets	11 47
17	F	Quinquageſima, or Shrove Sunday.	5 A 44	0 A 40
18	M	*Nun-Eaton*, Warwickſhire.	7 6	1 32
19	Tu	**Shrove Tueſday.**	8 29	2 23
20	W	Aſh-Wedneſday, 1ſt Day of Lent.	9 53	3 13
21	Th	Day 10 hours 22 min. long.	11 17	4 4
22	F	*Beverly*, Yorkſhire. Fretum.	Morn.	4 57
23	S	*Godalming*, Surrey. (*Faſt.*	0 39	5 50
24	F	1 Sun. in Lent. St. Mat. Ap. and M.	2 0	6 47
25	M	*Feverſham*, Kent. *Llaufechel*, Angleſe	3 18	7 46
26	Tu	*Oundle*, Northamptonſhire.	4 24	8 44
27	W	Ember Week.	5 17	9 41
28	Th	*Cheſterfield*, Derbyſhire.	5 57	0 36
29	F	Days increaſed 3 hours 8 min.	6 20	1 26

M D	☉ Riſes	☉ Sets	♄ Sets	♃ Riſes	♂ Riſes	☿ Riſes	♀ Riſe	Cl. faſt.
1	7h 26	4 34	7 A 29	7 M 17	8 A 29	4 M 37	6 M 17	14′ 8″
6	7 18	4 43	7 12	7 0	8 6	4 43	6 23	14 38
11	7 9	4 52	6 55	6 43	7 41	4 48	6 27	14 46
16	7 2	4 59	6 39	6 27	7 14	4 53	6 30	14 38
21	6 50	5 11	6 24	6 10	6 48	4 57	6 31	14 9
26	6 41	5 20	6 8	5 53	6 20	4 59	6 30	13 25

MARCH hath XXXI Days.

Full Moon the 1ſt	Day at	20 min. after 9 at Night.
Laſt Quarter the 9th		59 min. paſt 11 at Night.
New Moon the 17th		53 min. after 7 Morn.
Firſt Quarter the 25d		40 min. paſt 11 at Night.
Full Moon the 31ſt		7 min. paſt 1 Afternoon.

M D	☉ De Sc	
1	7°	
6	5	
11	3	
16	1	
21	0 N	3
26	2	2

1	S	David Arch. B. M.	6 M 52	Mor	
2	E	Reminiſcere, 2 Sunday in Lent.	☽ Riſes	0	1
3	M	Days are now 11 hrs and 4 min. long	7A 20	0	5
4	Tu	*Melton Mowbray*, Leiceſterſhire.	8 30	1	4
5	W	*Blandford*, Dorſetſh. *Caerwye*, Flintſh	9 39	2	2
6	Th	*Bourn*, Linc. *Whitland*, Glouceſtſh.	10 48	3	
7	F	Perpetua Maurit. M. *Nottingham.*	11 55	3	4
8	S	Cyprian.	Morn.	4	3
9	E	Oculi, 3 Sunday in Lent.	1 3	5	1
10	M	Days are now encreaſed and Nights	2 10	6	
11	Tu	decreaſed 3 hours and 52 min.	3 11	6	5
12	W	Greg. M. B. of R & C.	4 5	7	4
13	Th	and are encreaſing daily.	4 50	8	4
14	F	*Noathop*, Flintſh. *Sevenoak*, Kent.	5 25	9	3
15	S	*Oakham*, Rutl. *Oſweſtry*, Shropſh.	5 53	10	3
16	E	Midlent Sunday. [Wilts.	6 17	11	2
17	M	*Hariff*, Huntingdonſh. *Malmeſbury*,	☽ Sets	0A	1
18	Tu	Ed. R. of Weſt. Sax. *Workſop*, Not.	7A 36	1	
19	W	☉ ent. ♈. 15 h. 11 min. appar. Time.	9 3	2	
20	Th	*Durham.* Equal Day and Night.	10 30	2	5
21	F	Benedict. Abb. of *Downes*, Devonſh.	11 56	3	5
22	S	Day 12 hours and 20 min. long.	Morn.	4	5
23	E	Judica 5 Sunday in Lent. [Faſt.	1 17	5	4
24	M	*Llanerchemith*, Caerm. *Shirley*, St. W.	2 27	6	4
25	Tu	Annunci. L. Day. Pr. EDWARD b.	3 24	7	4
26	W	*St. Albans*, Hertf. *Glouceſter*. *Namptw*	4 8	8	3
27	Th	Ch. *Atherſtone*, Warw. *Preſt*. Lanc.	4 40	9	3
28	F	*Cobham*, Surrey. *Patrington*, Yorkſh.	5 7	10	1
29	S	*Stourbridge*, Worceſt.	5 26	11	
30	E	Palm Sunday.	5 43	11	4
31	M	*Durham*, laſts 3 Days (Luke Elſtob.)	☽ Riſes	Morn	

M D	☉ Riſes	☉ Sets	♄ Sets	♃ Riſes	♂ Riſes	♀ Sets	☿ Riſes	Cl. bef.
1	6h 33′	5h 28	5 A 56	5 M 40	5 A 56	4 M 59	6 M 28	12′ 4
6	6 23	5 38	5 21	5 25	5 28	4 59	6 25	11 3
11	6 13	5 48	Riſes	5 9	Sets	4 57	Sets	10 1
16	6 3	5 58	6 M 4	4 53	6 M 17	4 53	6 A 16	9 4
21	5 53	6 8	5 47	4 37	5 56	4 49	6 58	7 1
26	5 43	6 18	5 30	4 22	5 35	4 44	7 38	5 4

APRIL hath xxx Days.

Laſt Quarter the 8th } Day at { 10 min. bef. 6 Aftern.
New Moon the 15th } Day at { 10 min. paſt 5 Aftern.
Firſt Quarter the 22d } Day at { 10 min. bef. 9 Morn.
Full Moon the 30th } Day at { 28 min. aft. 5 Morn.

M D	☉ Decl. North.
1	4° 49′
6	6 44
11	8 35
16	10 23
21	12 06
26	13 45

1	Tu	All Fools-Day, *Coventry*, Warwickſh.	7 A 34	0 M 27
2	W	*Lutterworth*, Leiceſterſh. *Saliſb.* Wilts	8 43	1 7
3	Th	**Richard** B. of C. *Chicheſter*, Suſſex	9 51	1 49
4	F	Good Friday. **St. Ambr.** B. of M.	11 0	2 33
5	S	Old Lady Day. *Hunt.* Montg. (*Faſt.*	Morn.	3 19
6	E	EASTER-DAY. Our SAVIOUR's Reſ	0 8	4 7
7	M	Eaſter Monday, *Atherſtone*, Warwick.	1 11	4 57
8	Tu	Eaſter Tueſday, *Selby* Y. Ch. Meſban.	2 6	5 48
9	W	Days encreaſed 5 hours and 46 min.	3 53	6 42
10	Th	and are now 13 h and 34 m. long.	3 31	7 34
11	F.	*Newport-Pagnel*, Bucks.	4 2	8 26
12	S.	*Haltwhiſtle*, Northumb.	4 26	9 17
13	E	Low Sunday. 1 Sund. after Eaſter.	4 48	10 10
14	M	Days are now 13 h 50 min. long	5 7	11 2
15	Tu	*Bewley*, Hampſhire. [Dorſet.	☽ Sets	11 54
16	W	*Ditton's-Marſh*, Wilts. *Piddle-Town*,	8 A 9	0 A 49
17	Th	*Malmſbury*, Wilts.	9 40	1 45
18	F	*Cobham*, Surrey. *Derby.*	11 8	2 45
19	S	**Alphage** Archb. Cant.	Morn.	3 45
20	E	2 Sunday after Eaſter.	0 25	4 48
21	M	From the D. of Eaſt. in 15 Days (20)	1 29	5 48
22	Tu	*Giſborough*, Yorkſh. *Shrewſb.* Shropſh.	2 18	6 44
23	W	**St. George** Martyr. Term begins.	2 54	7 35
24	Th	*Aberforth*, Yorkſh. *Linc. Harb.* Norf.	3 21	8 23
25	F	St. Mark Ev. & M. *Buckingham.*	3 41	9 8
26	S	Prince WILLIAM born.	3 59	9 51
27	E	3 Sunday after Eaſter.	4 14	10 32
28	M	From the Day of Eaſter in 3. W. (27)	4 28	11 14
29	Tu	*Market-Harbro'*, Leiceſt. *Newchurch*,	4 44	11 55
30	W	Lanc. *Giſborough*, Yorkſhire.	☽ Riſes Morn.	

M D	☉ Riſes	☉ Sets	♄ Riſes	♃ Riſes	♂ Sets	♀ Riſes	☿ Sets	C. bef. ☉
1	5h 31	6h 30	5 M 9	4 M 3	5 M 8	4 M 3	8 A 19	3′ 40″
6	5 21	6 40	4 52	3 46	4 47	4 32	8 41	2 19
11	5 12	6 49	4 34	3 29	4 26	4 24	8 47	0 54
16	5 2	6 59	4 18	3 14	4 6	4 17	8 36	0 Aft. 9
21	4 53	7 8	4 0	2 57	3 47	4 10	8 10	1 31
26	4 44	7 14	3 41	2 40	3 26	4 1	7 28	2 27

MAY hath xxxi Days.

Laſt Quarter the 8th } Day at { 42 min. paſt 7 Morning.
New Moon the 15th } Day at { 2 min paſt 1 Morning.
FirſtQuarter the 21ſt } Day at { 34 min. paſt 7 Afternoon.
Full Moon the 29th } Day at { half paſt 9 Morning.

M D	☉ Dec North	
1	15°	18
6	16	44
11	18	
16	19	1
21	20	2
26	21	1

1	Th	St. Philip and Jac. Ap. & M.	8A 57	0 M 3
2	F	*worth*, Derb. *Lanc. Breck. Redr.* Corn.	10 4	1 2
3	S	Invent. of the Croſs. ***Weſtham***, Kent.	11 9	2
4	E	4 Sunday after Eaſter.	Morn.	2 5
5	M	From the Day of Eaſter in 1 Month.	0 6	3 4
6	Tu	St. John Evang. ante port Lat. ***Kend.***	0 56	4 4
7	W	*Bath*, Som. *Dunmow*, Eſſex, *Leek*, St.	1 37	5 3
8	Th	*Philips-Norton*, Som.	2 9	6 2
9	F	*Boſworth*, Leic. *Tockingham*, Glouceſt.	2 36	7 1
10	S	*Fringe*, Norf. *Lutterworth*, Leic.	2 57	8
11	E	5 Sunday after Eaſter. Rogat. Sund.	3 16	8 5
12	M	Old May Day. (From the Day of E. 5	3 34	9 4
13	Tu	(*Barnſley* Yorkſh. the 12th A. Horſ.	3 53	10 3
14	W	Rogat. Week. ***Denby. Wells***, Som. (f.	4 14	11 3
15	Th	Holy Thurſday Chriſt's Aſcenſion	☽ Sets	0 A 30
16	F	On the Morrow of the Aſcenſion.	10 A 5	1 31
17	S	*Aſhford, Holbeach*, Linc. ***Wareham***, D.	11 17	2 35
18	E	Exaudi. 6 Sunday after Eaſter.	Morn.	3 37
19	M	Dunſtan, Archb. C. Term Ends.	0 16	4 37
20	Tu	*Galgarth*, Breckn. ***Wickham***, Hants.	0 58	5 33
21	W	*Aſhborn*, Derb. ***Cromſtock*** Devonſh.	1 28	6 23
22	Th	*Albots-Bromley*, Staff. ***Greenſtreet*** Eſ.	1 50	7 9
23	F	*Dorcheſter*, *Bala*. **Merioneth.**	2 9	7 51
24	S	Pr. FRED. WIL. born. ***Faſt.***	2 24	8 33
25	E	Whit-Sunday. Deſcent of the H. G.	2 38	9 13
26	M	Whit-Monday. ***Rotherham***, Y. A.H.	2 52	9 55
27	Tu	Whit-Tueſday, ***Newark*** upon Trent.	3 7	10 30
28	W	Ember Week. ***Bingham***, Not.	3 24	11 20
29	Th	K. CHAR. II. Birth and Ret. ☽ Ec. in	☽ Riſes	Morn.
30	F	*Derby*, *Rocheſter*, Kent. ***Workſop*** Not.	9A 1	0 6
31	S	Days increas'd 8 hours 32 min.	10 1	0 54

MD	☉ Riſes	☉ Sets	♄ Riſes	♃ Riſes	♂ Riſes	♀ Sets	☿ Sets	Cl. aft. ☉
1	4h 35'	7h 26'	3 M 24	2 M 23	3 M 7	3 M 52	4 M 25	3' 12''
6	4 27	7 34	3 5	2 4	2 49	3 44	4 10	44
11	4 19	7 42	2 47	1 46	2 30	3 35	3 56	00
16	4 11	7 50	2 28	1 28	2 11	3 26	3 42	4 2
21	4 4	7 57	2 9	1 10	1 53	3 18	3 30	3 50
26	3 58	8 3	1 50	0 51	1 35	3 10	3 18	3 24

JUNE hath xxx Days.

M D	☉ Dec North.
1	22° 10′
6	22 45
11	23 10
16	23 25
21	23 29
26	23 23

aſt Quarter the 6th } Day at { 32 min. paſt 5 Afternoon.
New Moon the 13th } Day at { 18 min. paſt 8 morn.
irſt Quarter the 20 } Day at { 11 min. paſt 8 Morn.
Full Moon the 28th } Day at { 23 min, paſt Noon.

☉ enters ♋ 20 D. 14 ho. 8 m. apparent Time.

1	E	Trinity Sunday.	10A 54	1 M44
2	M	On the Morrow of the Holy Trinity	11 37	2 35
3	Tu	*Haxſley Green,* Linc. *Kerby Steph.* W.	Morn.	3 26
4	W	Prince of W. b. *Newark,* on Trent.	0 12	4 17
5	Th	Bonif. B. of Mentz, M.	0 38	5 7
6	F	Term begins. *Folkingham,* Linc.	1 0	5 56
7	S	*Montgamery, Stow in Guillam,* Suff.	1 29	6 43
8	E	1 Sunday after Trinity.	1 36	7 30
9	M	In 8 Days of the Holy Trinity (8.)	1 53	8 20
10	Tu	*Cranbrook,* Kent. *Hounſlow* Middleſ.	2 12	9 11
11	W	St. Barnabas Ap. & M.	2 35	10 6
12	Th	☉ eclipſed viſible. *Haverford-Weſt.*	3 2	11 7
13	F	*Kedderminſter,* Worc. *Llanerchemith,* A.	☽ Sets	0A 9
14	S	*Bangor,* Cornw.	9A 57	1 14
15	E	2 Sunday after Trinity. (15	10 47	2 17
16	M	From the D. of the H.T. in 15 Days	11 23	3 15
17	Tu	St. Alban, M. *St. Alban's* Herf.	11 50	4 9
18	W	*Darlington,* Durh. (L.E) *Wiggan,* L.	Morn.	4 58
19	Th	*Ingleton,* Yorkſh. Longeſt Days.	0 10	5 43
20	F	Tranſl. of Edw. K. of Weſt. Sax.	0 26	6 26
21	S	Days will now begin to grow *ſhorter.*	0 41	7 7
22	E	3 S. after Trin. K. Geo. II. Inaug.	0 55	7 48
23	M	From the D. of the H.T. 3 W. (22) *F.*	1 9	8 29
24	Tu	Nat. St. John Bap. (*Selby* Y. 23.)	1 26	9 12
25	W	Day 16 ho. and above an half long.	1 45	9 57
26	Th	K. GEORGE II. proclaimed, 1727	2 7	10 45
27	F	*Boſton,* Linc. *Built,* Breck. *Burt.* Staff.	2 38	11 34
28	S	*Folkeſt.* St. *Pombs,* Corn. *Stow Green,* D.	☽ Riſes	Morn.
29	E	4 S. after Trin. St. Peter, Ap. & M	9A31	0 25
30	M	*Bridgenorth,* Sh. *Thwayte-Pariſh,* Suff.	10 8	1 18

M D	☉ Riſes	☉ Sets	♄ Riſes	♃ Riſes	♂ Sets	♀ Riſes	☿ Riſes	C. aft. ☉
1	3h 53′	8h 9′	1 M26	0 M27	1M14	1 M 1	3M 6	2′ 39
6	3 47	8 13	1 6	0 7	0 55	2 56	2 58	1 50
11	3 45	8 15	0 46	11 A42	0 37	2 51	2 57	0 52
16	3 44	8 16	0 26	11 21	0 19	2 47	2 59	obſ. 10
21	3 43	8 17	0 5	11 1	11A 58	2 46	3 10	1 14
26	3 44	8 16	11A 41	10 41	11 41	2 46	3 30	2 17

JULY hath xxxi Days.

Laſt Quarter the 5th	Day at	24 min. paſt Midnight.
New Moon the 12th		7 min. before 4 Aftern.
Firſt Quarter the 19th		15 min. paſt 11 at Night
Full Moon the 28th		36 min. paſt 1 Morn.

M D	☉ D No
1	23
6	22
11	22
16	21
21	20
26	19

1	Tu	*Hith*, K. *Thorney-Abbey*, Ely *Workſop*,	10 A	38	2
2	W	Viſit. of the B. V. Mary. *Brecknock.*	11	1	2
3	Th	*Dereham*, Norf. *Shrewſbury*, *Potton*, B.	11	21	3
4	F	*Cheſterfield*, Derb. *Lancaſter. Hogſha.*	11	37	4
5	S	Old Midſummer, *Beverly*, Yorkſhire.	11	55	5
6	**E**	5 Sunday after Trinity.	Morn		6
7	M	**Tho. a Becket.** *Chipping-Norton.*	0	11	6
9C 8	Tu	*Foleſtone*, Kent. *Machynleth*, Montg.	0	31	7
9	W	*Bromley*, Devonſh.	0	55	8
10	Th	*York*, Chr. Meſham. *Hythe*, *S. P.* in Th.	1	27	9
11	F	*Peterborough*, Northamp.	2	11	10
12	S	*Canterbury*, Kent. *Carſharlton*, Surry.	☽ Sets		11
13	**E**	6 Sunday after Trinity.	9 A	12	0
14	M	Days are decreaſing every Day.	9	44	1
15	Tu	Swithin, B. of Wincheſter tranſlated	10	8	2
16	W	*Wincheſt. Polſtead*, Suff. *Woodhurſt*, Dor.	10	26	3
17	Th	*Belt*, Breck. *Leek*, Staff. *Lanibithew*, D.	10	42	4
18	F	*Denbigh. Penryn*, Corn. *Warrington*, L.	10	56	4
19	S	*Kenninghall*, Norfolk.	11	12	5
20	**E**	7 Sunday after Trinity.	11	27	6
21	M	*Alberwin-Green*, Hampſh. *Swaffh.* N.	11	45	7
22	Tu	St. Mary Magdalene. *Colcheſter*, Eſ.	Morn.		7
23	W	*Daventry*, North. *Matenſley-Green*, dit.	0	6	8
24	Th	*Faringbay*, Kent. *Faſt.*	0	33	9
25	F	St. James Ap. & M. *Derby*, *Doncaſter*	1	9	10
26	S	St. Anne, Mother to the bleſſed V.M.	1	55	11
27	**E**	8 Sunday after Trinity.	2	52	M
28	M	*Fairſa*, Cornw. *Winchcomb*, Glouc.	☽ Riſes		0
29	Tu	Dog Days begin.	9 A	3	0
30	W	*Caerlton*, Monm. *Linton*, Camb.	9	24	1
31	Th	*Barkway*. Hertf. *Uxbridge*, Midd.	9	42	2

M D	☉ Riſes	☉ Sets	♄ Riſes	♃ Riſes	♂ Sets	♀ Riſes	☿ Riſes	Cl
1	3h 45'	8 15	11 A 20	10 A 19	11 A 23	2 M 48	8 A 50	3
6	3 48	8 12	11 0	9 59	11 7	2 53	9 4	4
11	3 53	8 7	10 40	9 37	10 50	3 1	9 7	4
16	3 58	8 2	10 19	9 16	10 35	3 10	9 5	5
21	4 4	7 56	10 0	8 56	10 19	3 21	8 58	5
26	4 [illegible]	7 40	9 [illegible]	8 36	10 [illegible]	3 [illegible]	8 47	[illegible]

AUGUST hath xxxi Days.

M D	☉ Decl. North.
1	18° 36′
6	16 35
11	15 8
16	13 35
21	11 57
26	10 14

Quarter the 4th
Moon the 10th
Quarter the 18
Moon the 26th

} Day at {

45 min. paſt 5 Morning.
44 min. after Midnight.
40 min. paſt 4 Afternoon.
26 min. paſt 1 Afternoon.

F	**Lammas Day.** *Bath*, Som. *Lou.* L.	9A59	3M18
S	*Hedon.* Yl Fretum. *Winchcſt.* Hamp.	10 14	4 5
E	9 Sunday after Trinity.	10 35	4 53
M	*Daventry*, Northamp. *Thurok*, Yorkſh.	10 57	5 43
Tu	*Epſom*, Surry. Iſaac Tarrat, *Yarmouth.*	11 24	6 37
W	Tranſfig. of our Lord. *Boſton*, Linc.	Morn.	7 33
Th	Name of Jeſus. *Falmouth*, Cornw.	0 2	8 33
F	*Parſut*, Cornw. *Ruthin*, Denb.	0 53	9 36
S	*Llanwiſt*, Denb. *Sherkin*, Midd.	1 57	10 39
E	10 Sunday after Trinity.	3 14	11 37
M	*Aberfraw*, Angleſea. *Allchurch*, Here.	☽ Sets	0A32
Tu	Old Lammas-Day, *York*, Chr. M.	8A29	1 22
W	*Northamptm.* St. *Eades*, Hert. *Stow*, S.	8 47	2 9
Th	Days are ſhortened full 2 Hours.	9 3	2 54
F	*Bakewell*, Derb. *Preſton*, Lanc.	9 17	3 36
S	*Aſhborn*, Derb. *Giſborough*, Yorkſh.	9 33	4 19
E	11 Sund. after Trinity.	9 50	5 2
M	Day 14 h. 24 min. long.	10 10	5 46
Tu	*Dartington*, Devonſhire.	10 35	6 32
W	☉ Amplitude N. 16°. 35′.	11 8	7 20
Th	*Hearnor*, Derb. *Horncaſtle*, Linc.	11 49	8 10
F	*Bracknell*, Berks. *Penkridge*, Staff.	Morn.	9 3
S	*Belford*, Northum. *Dinton*, Oxf. *Faſt.*	0 44	9 56
E	12 S. after Trin. St. BARTHOLOMEW	1 49	10 48
M	*Llanerchemith*, Angl. *Milver.* Som.	3 0	11 40
Tu	*Carliſle.* *Huntingdon.* *Worceſter.*	☽ Riſes	Morn.
W	*Coventry*, Warw. *Ripley*, York.	7A 53	0 30
Th	St. Au. B. of Nip C. D.	8 10	1 20
F	**Beheading of John Bapt.**	8 27	2 8
S	☉ due E. 6 ho. 30′ Alt. 12°. 27′.	8 45	2 56
E	13 Sunday after Trinity.	9 7	3 46

☉ Riſes	☉ Sets	♄ Riſe	♃ Riſes	♂ Sets	♀ Riſes.	☿ Sets	Cl. bef. ☉
4h 19	7 40	9 A 17	3 A 11	9A 45	3 M 50	8 A 31	5′ 45″
4 27	7 32	3 57	7 50	9 31	4 6	8 14	5 20
4 35	7 24	8 37	7 29	9 17	4 23	7 56	4 39
4 44	7 15	8 19	Sets	9 4	Sets	7 36	3 44
4 53	7 6	3 0	4 M 19	8 51	7 18	7 13	2 37
5 0	6 57	7 4[illegible]	3 57	8 38	7 A 12	6 50	1 19

SEPTEMBER hath xxx Days.

Last Quarter the 2d } Day at { 11 in the Forenoon.
New Moon the 9th } Day at { 19 min. before Noon.
First Quarter the 17th } Day at { 35 m. past 11 Foren.
Full Moon the 24th } Day at { 7 m. past Midnight.

☉ Enters ♎ 22 D. 3 H. 42 min. apparent Time.

M D	☉ Decl. North.	
1	8°	5
6	6	14
11	4	20
16	2	24
21	0	28
26	1 S	30

1	M	Giles Abb. & C. *Northmoore*, Wilts	9A	32	4M	40
2	Tu	*Richmond-Rood*, North.	10	6	5	35
3	W	*Brecknock*, 6 Days. *Bridgestock*, Dev.	10	52	6	33
4	Th	*Bartholomew*, Lon. *Norw. Dover*. Kent	11	52	7	34
5	F	*Chipping Norton*, Oxf. *Fenningham*. Suf.	Morn.		8	39
6	S	Dog Days end. *Falkingham*. Linc.	1	4	9	35
7	E	14 Sunday after Trinity.	2	21	10	29
8	M	Nativ. of the B. V. M. *Northamp.*	3	42	11	21
9	Tu	*Devises*, Wilts. *Stourbridge*, Worcest.	☽ Sets		0A	9
10	W	Day 12 hours 56 m. long.	7A	15	0	54
11	Th	*Tallowdown*. Dorsetsh.	7	31	1	37
12	F	*Downderry-Hill*. Som. *Whitehaven*, C.	7	46	2	21
13	S	*Iron-Acton*, Gl. *Newt*. Lan. *Tregony*, C.	8	1	3	3
14	E	15 Sunday after Trinity. Holy Croſs	8	20	3	46
15	M	*Durham*. (L. Elſtob.)	8	44	4	33
16	Tu	*Lutterworth*. Leic. *Newcaſtle*, Staff.	9	13	5	20
17	W	Ember Week. *Probus*, Cornw.	9	50	6	8
18	Th	*Netheſtow* Som. *Southw*. *Stirbitch*, Ca.	10	39	6	58
19	F	*Carliſle*, Cumb. *Huntingdon*. *Worceſt.*	11	39	7	53
20	S	*Devizes*, Wilts. *Giſbo*. Y. *Mancheſter*,	Morn.		8	46
21	E	16 Sunday after Trinity. St. Matth.	0	48	9	38
22	M	Equal Day and Night. *Alichurch*. W.	2	2	10	28
23	Tu	*Halkin*, Wilts. *Paincaſtle*, Radnor.	3	23	11	18
24	W	*Cheſhunt*, Hertf. *Wickware*, Glouc.	4	44	Morn.	
25	Th	*Hedon*, Y. Fretum. *Cheſterfield*, Derb	☽ Riſes		0	9
26	F	St. Cyprian, Archb. of Car. & M.	6A	58	0	58
27	S	*Clapham*, Yorkſh. *Northall*, Midd.	7	20	1	48
28	E	17 Sunday after Trinity.	7	44	2	42
29	M	St. Michael, and all Angels.	8	15	3	39
30	Tu	St. Jer. Pr. C. & D. *Wrexham*, Denb.	8	58	4	37

M.D.	☉ Riſes		☉ Sets		♄ Riſes		♃ Sets		♂ Sets		♀ Sets		☿ Sets		Cl. aft. ☉	
1	5h	13	6	46	7A	19	3M	22	8A	24	7A	3	6A	23	0'	30
6	5	23	6	36	7	0	3	10	8	13	6	55	Riſes		2	05
11	5	33	6	26	6	41	2	49	8	2	6	47	4M	13	3	47
16	5	43	6	16	Sets		2	30	7	51	6	38	4	0	5	32
21	5	52	6	7	5M	32	2	9	7	41	6	30	4	9	7	16
26	6	2	5	57	5	12	1	49	7	22	6	22	4	32	8	57

OCTOBER hath xxxi Days.

Laſt Quarter the 1ſt 25 min. paſt 5 Afternoon.
New Moon the 9th 46 min. paſt 1 Morning.
Firſt Quarter the 17 Day at 27 min. paſt 6 Morning.
Full Moon the 24 32 min. paſt 10 Morning.
Laſt Quarter the 31 1 min. after 2 Morning.

M D	☉ Decl. South	
1	3°	27
6	5	23
11	7	17
16	9	9
21	10	58
26	12	42

1	W	**Remig** B. of Rhemes.	9A	53	5M	38
2	Th	*Nottingham*, laſts 8 Days, for Hops,	11	1	6	39
3	F	Cheeſe and all Sorts of Cattle	Morn.		7	39
4	S	*Kettering*, Northamp. *Penkridge*, Staff.	0	18	8	34
5	E	18 Sunday after Trinity.	1	37	9	26
6	M	**Faith**, V. & M. *Hull*, Yorkſh.	2	55	10	13
7	Tu	*Billericay*, Eſſex. *Counteſs-Court*, Wilt.	4	10	10	59
8	W	*Abingdon*, Berks. *Challock*, K. *Swanſey*.	5	25	11	43
9	Th	**St. Dennis** Areop. B. & M. *Lancaſt.*	☽ Sets		0A	25
10	F	Old Michaelmas-Day. *Barnſley*.	6A	16	1	8
11	S	*Leiceſter*. *Bedal*, Y. St. *Albans*, Hertf.	6	33	1	50
12	E	19 Sunday after Trinity.	6	54	2	35
13	M	Tranſlat. of K. Ed. Conſ. *Saliſb.* Wilts	7	20	3	22
14	Tu	*Buttonmoor*, Shropſh. *Workſop*, Not.	7	52	4	9
15	W	*Falſey*, Warw.	8	35	5	0
16	Th	*Boſworth*, Leic. *Hay*, Breckn.	9	31	5	52
17	F	Etheldred, Virg. *Lynn*, Norf.	10	35	6	44
18	S	St. Luke the Evangeliſt. *ank* Staff.	11	47	7	36
19	E	20 Sunday after Trinity	Morn.		8	24
20	M	*Aſhborne*, Derb. *Colcheſter*. *Hereford*.	1	5	9	13
21	Tu	*Heanor*, Derb. *Banbury*, O. *Gainſb.* L.	2	23	10	2
22	W	King Geo. II. crowned, 1727.	3	44	10	53
23	Th	*Ripley*, Derb. *Saff. Wald.* Eſſ. *Stock*. Ch.	5	8	11	43
24	F	*Tamworth*, Staff. *Windſor* Berks	☽ Riſes		Morn.	
25	S	**Criſpin**, Mart. *Charing*, Kent,	5A	50	0	36
26	E	21 Sunday after Trinity.	6	18	1	33
27	M	*Affingham*, D. *Buckingham*. *Warwick*.	6	57	2	32
28	Tu	St. Simon and St. Jude. Ap. & M.	7	49	3	33
29	W	*Newcaſtle* upon *Tyne*, laſts 9 D. (L. El.)	8	54	4	36
30	Th	*Banbury*, Ox. *Ely*, Cam. *Maidenhead*, B.	10	9	5	38
31		*Bridgenorth*, Shrop. *Devizes*. *Settle*, Y.	11	29	6	35

M D	☉ Riſes	☉ Sets	♄ Sets	♃ Sets	♂ Sets	♀ Sets	☿ Riſ.	Cl. aft. ☉
1	6h 12'	5h 47	4M 52	1 M 30	7A 23	6 A 14	5M 3	10' 34'
6	6 22	5 37	4 31	1 10	7 14	6 6	5 36	12 5
11	6 31	5 28	4 11	0 51	7 7	5 59	6 9	13 23
16	6 41	5 18	3 50	0 33	7 0	5 51	Sets	14 30
21	6 51	5 8	3 39	0 15	6 52	5 45	5 A 16	15 22
26	7 0	4 59	3 10	11 A 53	6 46	5 40	5 10	15 57

NOVEMBER hath xxx Days.

D.	South.
1	14°41
6	16 14
11	17 4
16	18 5
21	20 07
26	21 0

New Moon the 7th	Day at	5 min. bef. 7 at Night.
Firſt Quarter the 15		a quarter before Midnight.
Full Moon the 22d		5 min. bef. 9 at Night.
Laſt Quarter the 29		half paſt 1 Afternoon.

1	S	All Saints. *Coventry*, *W. Newark*, *Nott*	Morn		7M	2
2	E	22 Sun. af. Trin. All Souls	0	4	8	1
3	M	On the Morrow of all Souls.	2	4	9	2
4	Tu	*Appleſhaw*, Hants.	3	10	9	4
5	W	Papiſts Conſpiracy. *Beverly*, Yorſh.	4	2	0	26
6	Th	**Leonard**, Conf. Term begins.	5	39	11	8
7	F	*Preſton*, Lanc. *Workingham* Berks.	☽ Sets		11	5
8	S	*Cirenceſter*, *Colcheſter*. *Hertford*. *Kendal*	5 A	1	0 A	34
9	E	23 Sunday after Trinity.	5	23	1	2
10	M	K. Geo. II. born, 1683.	5	54	2	7
11	Tu	**St Martin** Bp. and Conf.	6	33	2	56
12	W	On the Morrow of St. Martin.	7	22	3	47
13	Th	Bricius, Bp. *York*, Ch. Meſban.	8	22	4	38
14	F	*Brecknock*, and five following Days.	9	30	5	27
15	S	**Machutus**, Bp.	10	43	6	1
16	E	24 Sunday after Trin.	11	59	7	
17	M	**Hugh**, Bp of Linc.	Morn.		7	5
18	Tu	In eight Days of Saint Martin.	1	16	8	37
19	W	*Woodcot*: Oxf. *Yarme*, Yorkſh.	2	35	9	2
20	Th	**Edmund**, K. & M.	3	58	10	1
21	F	☽ eclipſed inviſ. 22d.	[illegible]	25	11	1
22	S	**Cecilia**, V. & M. Old Martin.	☽ Riſes		Morn	
23	E	25 Sunday after Trinity.	4 A	43	0	
24	M	In 15 Days of St. Martin. (25)	5	30	1	1
25	Tu	Prince WILL. HENRY born.	6	32	2	1
26	W	*Caſtle-Town*, Monm.	7	47	3	2
27	Th	*Littlebury*, Eſſex.	9	7	4	2
28	F	Term Ends. *Lincoln*. *Northampton*.	10	27	5	1
29	S	*Aſhborne*, Derb. *Somerton*, Som. *Faſt*.	11	46	6	
30	E	Advent Sunday, St. AND. Ap. & M Princeſs Dow. of Wales born 30t	Morn.		6	5

M D	☉ Riſes	☉ Sets	♄ Sets	♃ Sets	♂ Sets	♀ Sets	☿ Sets	Cl. aft.	
1	7h 11	4h 48	2 M 45	11 A 32	6 A 40	5 M 34	5 A 4	16	1
6	7 20	4 39	2 24	11 15	6 35	5 31	4 59	16	
11	7 29	4 30	2 4	11 58	6 31	5 30	4 57	15	3
16	7 38	4 22	1 43	10 40	6 27	5 29	4 56	14	4
21	7 46	4 15	1 2	10 22	6 24	5 31	4 58	13	3
26	7 51	4 9	1 1	10 1	6 21	5 36	5 4	12	

DECEMBER hath xxxi Days.

New Moon the 7th } Day at { 13 min. past 2 Afternoon.
First Quarter the 15 } Day at { 38 min. past 2 Afternoon.
Full Moon the 22 } Day at { half past 7 Morning.
Last Quarter the 29 } Day at { 36 min. past 4 Morning.

☉ Enters ♑ 20d. 19h. 57 m. app. Time.

D	South.	
1	21°	58
6	22	38
11	23	6
16	23	22
21	23	29
26	23	24

1	M	*Rotherham*, Yorksh. Abr. Horstall	1M	1	7M	38
2	Tu	*Hoxne*, Suff.	2	12	8	20
3	W	*Darlington*, Durham. (Luke Elstob.)	3	22	9	1
4	Th	*Bangor*. *Thurok*, Y.	4	32	9	42
5	F	*Colford*, Gloucestershire.	5	41	10	24
6	S	St. Nicol. Bishop of Myra in Lycia.	6	50	11	8
7	E	2 Sunday in Advent. ☉ ecl. inv.	☽ Sets		11	56
8	M	Concept. of the B. V. M.	4A	22	0A	43
9	Tu	*Bradford*, Wilts.	5	7	1	33
10	W	*Kimbolton*, Hunt. *Newport*, Shrop. *Sw*	6	4	2	24
11	Th	*Bewdley*, Worc. *Preston*, L. *Roch*. Kent.	7	9	3	13
12	F	*Bedal*, York. *Chorley*, Dev. *Shrewsbury*	8	18	4	1
13	S	Lucy, V. & M.	9	32	4	49
14	E	3 Sunday in Advent.	10	47	5	35
15	M	*Atherstone*, Warw. *Namptwich*, Chesh.	Morn.		6	19
16	Tu	O Sapientia.	0	2	7	6
17	W	Ember Week. *Exeter*, Dev. *Grantham*	1	20	7	53
18	Th	*Spalding*, Linc.	2	43	8	43
19	F	*Bedford*, Northampton.	4	8	9	36
20	S	Shortest Day. (*Fast*.	5	36	10	35
21	E	4 Sunday in Advent. St. Thomas	7	5	11	39
22	M	*Newport-Keams*, Montgom.	☽ Rises		Morn	
23	Tu	Now *Saturdays* (Workmen obs.) will	5A	9	0	45
24	W	be the longest Days in the Week. F.	6	28	1	50
25	Th	Christmas-Day.	7	52	2	51
26	F	St. Stephen 1st Martyr.	9	14	3	45
27	S	St. John Ap. & Ev.	10	31	4	35
28	E	1 Sunday after Christmas. Ho. Inno.	11	46	5	21
29	M	*Cockhill*, Som.	Morn.		6	4
30	Tu	*Maiden-Bradley*, Wilts.	0	57	6	48
31	W	Silvest. B. of Rome	2	7	7	26

Drunk

M D	☉ Rises		☉ Sets		♄ Sets		♃ Sets		♂ Sets		♀ Sets		☿ Sets		Cl. afe. ☉	
1	7h	57	4h	3	0M	40	9A	47	6A	19	5A	43	5A	9	10'	19"
6	8	2	3	58	0	6	9	30	6	17	5	51	5	7	8	15
11	8	5	3	55	11A	5[illegible]	9	13	6	17	6	1	4	53	5	59
16	8	7	3	53	11	32	8	56	6	17	6	12	Rises.		3	34
21	8	8	3	52	11	11	8	39	6	16	6	24	7M	17	1	4
26	8	7	3	53	10	50	8	22	6	15	6	36	6	35	1	bef. 6

A TABLE of all the KINGS and QUEEN of England, ſince the Conqueſt.

The Year of the Birth of each King and Queen; alſo the Year, Month, and Day, whereon they began to reign: beginning the Year the firſt Day of January, 1758.					The Length of each Reign.			The Year expired ſince each Reign began an ended.	
Names.	Born.	Began to Reign.			Y.	M.	D	Beg	En
William Conq.	1027	1066	October	14	20	10	26	693	67
William Rufus	1057	1087	Septem.	9	12	10	24	672	65
Henry I.	1068	1100	Auguſt	2	35	4	0	559	624
Stephen	1105	1135	Decem.	1	18	10	24	624	60
Henry II.	1134	1154	October	25	34	8	11	605	57
Richard I.	1156	1189	July	6	9	9	0	570	56
John	1166	1199	April	6	17	6	13	560	54
Henry III.	1207	1216	October	19	56	1	0	543	48
Edward I.	1239	1272	Novem.	16	34	7	21	487	45
Edward II.	1284	1307	July	7	19	6	13	452	43
Edward III.	1312	1327	January	20	50	5	1	432	38
Richard II.	1366	1377	June	21	22	3	8	382	36
Henry IV.	1367	1399	Septem.	29	13	5	21	360	34
Henry V.	1389	1413	March	20	9	5	11	346	337
Henry VI.	1421	1422	Auguſt	31	38	6	4	337	29
Edward IV.	1442	1461	March	4	22	1	5	298	27
Edward V.	1471	1483	April	9	0	2	13	276	27
Richard III.	1443	1483	June	22	2	2	0	276	274
Henry VII.	1457	1485	Auguſt	22	23	8	0	274	25
Henry VIII.	1492	1509	April	22	37	9	6	250	21
Edward VI.	1537	1547	January	28	6	5	8	212	206
Mary. I.	1516	1553	July	6	5	4	11	206	20
Elizabeth	1533	1558	Novem.	17	44	4	7	201	156
James I.	1566	1603	March	24	22	0	3	156	134
Charles I.	1600	1625	March	27	23	10	3	134	11
Charles II.	1630	1649	January	30	36	0	7	110	74
James II.	1633	1685	February	6	4	0	7	74	7
William III.	1650	1689	Feb.	13	5	10	15	70	57
Mary II.	1662				13	0	23	70	65
Anne	1665	1702	March	8	12	4	24	57	45
George I.	1660	1714	Auguſt	1	12	10	10	45	32
George II.	1683	1727	June	11	whom God preſerve.				

A Compendious TABLE of INTEREST,

hewing the Intereſt of any Sum of Money, from a Million to a Pound; for any Number of Days, at any Rate of Intereſt.

N°.	l.	s.	d.	q.		N°.	l.	s.	d.	q	,
000000—	2739	14	6	0	,99	1000—	2	14	9	2	,14
900000—	2465	15	0	3	,29	900—	2	9	3	3	,12
800000—	2191	15	7	1	,59	800—	2	3	10	0	,11
700000—	1917	16	1	3	,89	700—	1	18	4	1	,10
600000—	1643	16	8	2	,19	600—	1	12	10	2	,80
500000—	1369	17	3	0	,49	500—	1	7	5	3	,70
400000—	1095	17	9	2	,79	400—	1	1	11	0	,50
300000—	821	18	4	1	,09	300—	0	16	5	1	40
200000—	547	18	10	3	,40	200—	0	10	11	2	,30
100000—	273	19	5	1	,70	100—	0	5	5	3	,01
90000—	246	11	6	0	,32	90—	0	4	11	0	,71
80000—	219	3	6	0	,96	80—	0	4	4	2	,41
70000—	191	15	7	1	,59	70—	0	3	10	0	,11
60000—	164	7	8	0	,22	60—	0	3	3	1	,81
50000—	136	19	8	2	,85	50—	0	2	8	3	,51
40000—	109	11	9	1	,48	40—	0	2	2	1	,21
30000—	84	3	10	0	,11	30—	0	1	7	0	,90
20000—	54	15	10	2	,74	20—	0	1	1	0	,60
10000—	27	7	11	1	,37	10—	0	0	6	2	,30
9000—	24	13	1	3	,23	9—	0	0	5	3	,67
8000—	21	18	4	1	,10	8—	0	0	5	1	,40
7000—	19	3	6	2	,96	7—	0	0	4	2	,41
6000—	16	8	9	0	,82	6—	0	0	3	3	,76
5000—	13	13	11	2	,58	5—	0	0	3	1	,15
4000—	10	19	2	0	,55	4—	0	0	2	2	,52
3000—	8	4	4	2	.41	3—	0	0	1	3	,80
2000—	5	9	7	0	,27	2—	0	0	1	1	,26
1000—	2	14	9	2	.14	1—	0	0	0	2	,63

RULE.

ultiply the Sum by the Number of Days; and that Product by the Rate per Cent. Then cut off the two laſt Figures to the Right Hand, and the reſt you muſt find in the Table.

xample, What is the Intereſt of 100 l. for 365 Days at 5 per Cent.

N°. of Days 365
multiply by 100
Product 36500
multiply by 5 Rate p. Cent.
1825100

Then in the Table
againſt 1000 is 2 14 9 2 ,14
800 2 3 10 0 ,11
20 0 1 1 0 ,60
5 0 0 3 1 ,15
Anſw. 5 0 0 0 ,00

Of the ECLIPSES of the *Luminaries* in 1760.

By Mr. LUKE ELSTOB, of *Elwick*.

ON *May* the 29 at 34 min. after 9 at Night, the MOON will be eclipſed 0° 47′ in ♐ 8° 50′; viſible.

JUNE the 12 at 21 min. after 7 in the Morning, the SUN will be eclipſed 4° 35′ in ♊ 22° 36′; viſible.

NOVEMBER the 22d at 15 min after 9 at Night, the MOON will be eclipſed 6° 30 in ♊ 1° 8′; viſible.

DECEMBER the 7 at 2 o'Clock in the Morning, the SUN will be eclipſed in ♐ 16° 2′; inviſible.

COMPUTATIONS of the *Eclipſes* of the LUMINARIES, which are expected to happen in the Year 1760. By Mr JOHN METCALFE, of *Wentworth-Houſe, Yorkſhire*.

First ☽ Ecl	London.	Wentworth.	Richmond.	Lower Limb.	La. ☽.
viſ. Beg.	9h 3′ 52″	8h 58′ 22″	8h 57 04″	☽ the 29th	52′ 13″ ⅓ n.
Ecl. ☍	9 22 31	9 17 01	9 15 43	Day of May	Dig. eclip.
Mid.	9 33 51	9 28 21.	9 27 03	P. Meridiem.	42′ 39″
End.	10 3 50	9 58 20	9 57 02	App. Time.	Duration.
				S. ☽ 14′ 47″ ½	59′ 58″.

ECLIPSE of the SUN.

	LONDON.		But, from ſome other		
Begins	6h 32′ 42″	13 June	numbers, this Eclipſe		
Viſible Ecliptic ☌	7 15 15	Ant. Mer.	will beg. and e. ſome-		
Middle	7 18 36		what *later* (viz.)		
Ends	8 06 54	Apparent.		h	m
Time of Incidence	45 54	Time.	Beginning	6	41
Ditto of Repletion	48 18		Middle	7	22½
Duration	1 34 12		End	8.	16
Dig. Ecl. on the lower Side	4° 42 29	Viſible.			

The Center of the *Lunar Penumbra*, in this ECLIPSE deſcends on the Globe, upon the Weſtern Coaſts of *Africa* 6h 36′ 23″ Apparent Time, A. M. in Latitude 12° 58′ N. and in Longitude 14° 47′ Weſt from *London*, a little to the South of the Influx of the River *Gambia*; and ſoon after croſſing that great River, it takes its Courſe over the inland and unknown Parts of this large *Peninſula* (viz.) *Zaara, Biliduргerid,* and *Tripoli*; and traverſing the *Mediterranean* a little to the North of *Candia*, it enters the leſſer *Aſia* near *Smyrna*, ſtill tending North-Eaſterly and purſuing its Direction towards the *Caſpian Sea*, paſſing the Southern Coaſts of the *Euxine Sea* over *Georgia*, and directly over the *Caſpian Sea*, into *Siberia*; where in Lat. 47° 48′ North, and in Long. 72° 20′ Eaſt from *London*, the Central Shade makes its neareſt Approach to the North Pole; from whence it bends South-Eaſterly, and continuing its Courſe through *Siberia*, the Northern Parts of *China* and the Bay of *Nankin*; and in the great Eaſtern Ocean, in Latitude 29° 59′ N. and in Longitude 137° 7′ Eaſt from *London*, to the South of *Japan*, the Center of the Penumbra riſes off the *Earth* into the *Expanſum*; 9h 46′ 41″ A. M. App. Time.

Viſ. L. Ec.	London.	Wentworth	Richmond	L. ☽ 4′ 12″	Up. Lim. ☽
Beginning	7h 47′ 44″	7h 42′ 14″	7h 40′ 56″		Dig. Ecl.
Ecliptic ☍	8 55 41	8 50 11	8 48 57	22 Nov. P.M.	6° 36′ 36″
Middle	9 03 01	8 57 31	8 56 13		Duration.
The End	10 18 18	10 12 48	10 11 30	App. Time.	2h 30′ 34″

Semi Diam. ☽ = 16′ 51″

7th *December* an inviſible *Eclipſe* of the Sun about 25 min. paſt 1 o Clock in the Afternoon, App. Time: it will be *Central*, but not *Total*, for the Moon is very near its *Apogæum*, and the Sun not far from its *Perigæum*; conſequently the Moon's apparent Semidiameter is leſs than that of the Sun, by about 1′ 34″; which therefore is the Breadth of the luminous Annulus that will encompaſs the Moon at the Middle of the Eclipſe.

In the preceding Calculations for the viſible Eclipſes of the Moon, I have added 50″ to the Semidiameter of the Shadow, for the Earth's *Atmoſphere*, according to the Direction of Sir ISAAC NEWTON; by which the Moon will viſibly dip *deeper* into the Shadow than the horizontal Parallaxes alone make it; and conſequently the Beginning will be a little *ſooner*, and the End as much *later* as is the Difference of Immerſion of the Moon's Limb, with, or without the *Atmoſpheric* Equation.—The following Computations for theſe two Lunar Eclipſes are made from the Parallaxes only, the aforeſaid Equation being wholly omitted.

May [illegible] 1760.	London.	Wentw.	Richm.	☽'s diſt. à Node = 9° 31′ 03″
A.M. app. T.	h m ſec.	h m ſec.	h m ſec.	Eccentricity 65633
Eclipſe Beg.	9 11 50	9 06 20	9 05 02	Duration 44′ 02″
Ecliptic ☍	9 22 37	9 17 01	9 15 43	Digits eclipſed 23′ 11″
The Middle	9 33 51	9 28 21	9 27 03	☽ Horiz. Parallax 0 54 0
End of the Eclip.	9 55 53	9 50 23	9 49 04	Semidiam. ☉ = 15′ 51″

Nov. 22, 1760.	London.	Wentwor.	Richmond	Eccentricity 6579
P.M. app. T.	h m ſec.	h m ſec.	h m ſec.	☽'s diſt. à No. 8° 04′ 45″
Eclipſe Beg.	7 49 50	7 44 20	7 43 02	Hor. Par. ☽ = 61 30
Ecliptic ☍	8 55 41	8 50 11	8 48 57	Semidiam. ☉ = 16 18
Middle	9 03 01	8 57 31	8 56 13	Duration 2h 25′ 38″
The Ecl. ends.	10 15 50	10 10 20	10 09 02	Dig. obſc. 6 18 43

Wentworth Houſe,
25 April 1759.

JOHN METCALFE.

Mr. *Thomas Harris*, of *Bugbrook* near *Northampton*, favoured us with the following Computations of the Eclipſes for 1760.

The Moon is eclipſed *May* 29 at Night, as follows from

Leadbetter's Tables. — Moon's lower Limb.

At *London* app. Time.				*Bugbrook*, app. Time.		
Begin *May* 29	8h	51'	02"	8h	47'	02"
Middle	9	22	36	9	18	36
End	9	54	10	9	50	10
Digits eclipſed		46'	32"		46'	32"

1760. *June* 13, Morning will happen a Solar Eclipſe.

Brent's Tables, *London*. — Manuſcript Tables for *Bugbrook*.

Apparent Time, on the Sun's lower Limb.

	D.	h.	m.	ſec.	h.	m.	ſec.
Beginning *June* 13		6	26	54	6	24	40
Middle		7	21	42	7	17	03
End		8	09	37	8	05	04
Digits eclipſed		4°	53'	42"	4°	08'	05"

Remark. — At 29 min. paſt 5, Lat. 5° 17' N. Long. 5°. 29' E. the *Penumbra* firſt enters the Diſk, and the Eclipſe firſt of all begins at Sun-riſing in the upper Edge of his Vertical Diameter, about *King's Caty*. At 6 ho. 27 min. Lat. 12° 43' N. Long. 12° 44' W. about St. *Philips* there will be a Central Eclipſe at the very Riſing of the Sun. At 7 ho. 36' Lat 41° 56' N. Long, 46° 43' W. on the Weſtern Ocean, the Eclipſe ends at Sun-riſing in the lower Edge of his vertical Diameter. In Lat. 45° 51' N. Long. 56° 09' E. at 7 min. paſt 8, the Sun is centrally eclipſed in the Nonageſima Degree. At 8 ho. 9 min. Lat. 46°, 11' N. Long. 57° 45' E. the Sun is both Central and Total eclipſed in the Meridian on the Northern Banks of the *Caſpian Sea*. At 8 ho. 30 min. Long. 178° 5' W, the Eclipſe begins at Sun-ſetting, in the lower Edge of his vertical Diameter. At 9 ho. 44 min. Lat. 28° 43' N. Long. 138° 52' E. there is a Central Eclipſe at the very ſetting of the Sun. And at 37 min. paſt 10, about the Iſle of *Baſhee*, Lat. 21° 25' N. Long. 120° 22' E. the Eclipſe wholly ends, at Sun-ſetting, in the upper Edge of his Vertical Diameter, while his laſt Rays are about being hidden under the Horizon; having continued in paſſing over the Earth, about 5 ho. and 8 min.

N. B. The Longitude is taken from *London*.

1760. *Nov.* 22 at Night, the Moon is eclipſed, as follows.

LONDON.	D	h	m	ſec.	*Bugbrook.*	h	m	ſec.
Beginning	22	8	51	29	- - - - - - - -	8	47	29
Middle		10	05	34	- - - - - - - - -	10	01	34
End		11	19	39	- - - - - - - - -	11	15	39
Digits eclipſed	6°	33′	20″		- - - - - - - -	6°	33′	20″

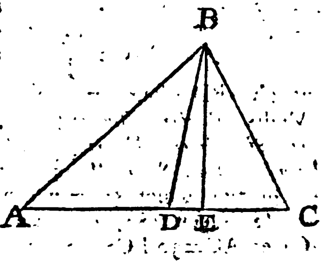
On the Moon's upper Limb. *Leadbetter's* Tables, App. Time.

December 7th, at 2, in the Afternoon, the Sun is eclipſed, Vertical Lat. 22°½ N. Long. 30° W. Viſible at the Iſlands of *C. de Verd*, and the *Atlantic Ocean*. Tho' this Eclipſe happens ſo long before Sun-ſetting, yet by reaſon of the Moon's great South Latitude, which is augmented by her Parallax; depreſſes her beneath the Sun's South Limb, and makes it inviſible to the Inhabitants of *Great Britain*.

He alſo remarks, that Mr. *Luke Elſtob's* Calculations of the Eclipſes for 1759, are taken verbatim from *Leadbetter's* Aſtronomy. See Vol. I. p. 356, &c.

ANSWERS to the QUESTIONS in the laſt Year's DIARY.

(1.) Queſt. 186, anſwered by Mr. *John Buddles.*



Let $6x = AD$; $4x = DC$; $10x = AC$. Then (by *Axiom* 4th of Plane Trig.) as $10x : 50 :: 10 : \frac{50}{x} =$ Difference of the Segments of the Baſe, made by letting fall a Perpendicular. ∴ $5x - \frac{25}{x} = \frac{5x^2 - 25}{x} = EC$.

Then (by 47. 1. E.) we have $225 - \frac{625 + 50x^2 - x^4}{x^2} = \overline{BE}^2$. Alſo $400 - \frac{25x^4 + 250x^4 - 625}{x^2} = \overline{BE}^2$. Therefore $225 - \frac{625 + 50x^2 - x^4}{x^2} = 400 - \frac{25x^4 + 250x^2 - 625}{x^2}$.

This Equation reduced, we have $24x^2 = 375$ ∴ $x = \sqrt{\frac{375}{24}} = 3{,}9528$; hence the whole Baſe is 39,528; the Segment $AD = 23{,}7168$; and $DC = 15{,}8112$: Whence the Area of each Piece is eaſily found. Q. E. D.

The ſame anſwered by Mr. *Geo. Guthrie.*

In the Triangle ABC (ſee fig. above) AB = 30, BC = 20, BD = 15; and for AD put $3x$, and DC $2x$; then $\frac{900-225-9x^2}{90x}=\frac{225+4x^2-400}{60x}=$ Coſine ADB = Coſine BDC = ,98742; therefore the Area of ABD = 175,6404; and the Area of BCD = 117,0935 ſquare Chains.

Mr. *Timothy Drury*'s Scholar, Maſter E. *Rawſtorne*'s Anſwer.

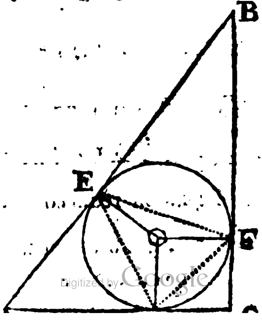
Let $a=15$, $b=20$, $c=30$; and $x=$ DE (ſee Fig. above) Then $\sqrt{a^2+x^2}=$ BE; and $\sqrt{c^2-a^2+x^2}-x=$ AD; $\sqrt{b^2-a^2+x^2}+x=$ CD; then $\sqrt{c^2-a^2+x^2}-x : \sqrt{b^2-a^2+x^2}+x :: 3 : 2$ (by Queſt.) and by mult. of Means and Extremes, and ſubſtituting s for the Sum of all the known Terms, and c for the Coefficients of x^2; we get $x=\frac{\sqrt{s^2}}{c}=2{,}3713$; whence AC = 39,5285 and the two Areas = 175,6413 and 117,0892. W. W. R.

Mr. *Chr. Meſſan* gives the following Solution.

Let fall the perpendicular BE (ſee laſt fig.) then $\overline{BC}^2-EC^2=\overline{BE}^2$. And $\overline{BE}^2+DE^2=\overline{BD}^2$. Then I aſſume AC = 40, and proceed as if it was the true Side, but find BD only 14,7; therefore I call AC only 39,5, and by proceeding as above, I at laſt find AC = 39,52847. Ergo AD = 23,717082 and DC = 15,811288. Hence the Area of the Triangle ABD is found = 17 A 2 R 10¼ P; and BDC = 11 A 2 R 33½ P.

Meſſrs. *Barker*, *Barnett*, *Boſton*, *Coram*, *Eaton*, *Foſter*, *Goodhead*, *Green*, *Harrington*, *Hartley*, *Holroyd*, *Kingſtone*, *Metcalfe*, *Stone*, *Scott*, *Ward*, and others ſent Solutions to this Queſtion, which Room will not permit us to publiſh.

(2) Queſt. 187, anſwered by Mr. *Joſeph Scott.*



Given AC = 30, BC = 40, and AB = 50; ∴ the Radius of the inſcribed Circle = 10; and AD = AE = 20, alſo EB = BF = 30. Then By *Trig.* the <s at A, and B, will be found = ,6 and ,8; and alſo, the Areas of the Segments of ED, DE, and EF = 28,54; 71,6935, and 94,3416 reſpectively; And the Areas of the Triangle CDF, ADE, and BEF = 50, 160, and 270 reſpec-

the Areas of the Segments adjoining, and we ſhall have for Areas at each Angular Piece; (viz.) at C, = 21,46; at A, 89,3065; and at B, 175,6584 Square Chains.

The ſame anſwered by Mr. *William Eaton.*

Firſt, it is plain the Triangle is a right angled one: Therefore let ABC (ſee Mr. *Scott's* Fig.) be the Piece of Ground; EFD the Pond; AC = 30, BC = 40; and AB = 50. Now, by plane Trigonometry the Angles may be found; ∴ the Angle at B = 36° 52′ 42″, whoſe Supplement is 143° 7′ 18″ = the Angle EOF; and the Angle at A = 53° 7′ 18″, whoſe Supplement is = 126° 52′ 42″ = the Angle EOD; and the Radius OD = OF = OE = 10; ∴ BF = 30 = BE; and AD = 20 = AE; and the Area of the Trapezium BEOFB = BE × EO = 30 × 10 = 300; alſo the Area of the Sector EOF, will be found = 124,89654; which, ſubtracted from 300, leaves 175,10342 = the Area BEF; after the ſame Manner the Areas AED are found = 89,2824; and CDF, = 21,459. Q. E. I.

The ſame anſwered by Mr. *Turner Boſton.*

Having all the Sides given find the < ABC = 36° 52′ (ſee Fig. above) < BAC = 53° 8′, < DOE = 126° 52′, < FOE = 143° 8′, and < FOD = 90°, and by a well known Theorem, the Rad. $= \frac{AC + CB - AB}{2} =$ FO = 10. Whence the Area of each Sector is DOE = 110,711812 Chains; FOE = 124,907398; and FOD = 78,54 Chains: Then the Area of each Piece (viz.) the Piece A = 8A, 3R, 29P. Piece B = 17A, 2R, 1 P. And the Piece C = 2A, 0R, 23P, as was required.

Mr. *Thomas Barnett*, of *Nottingham*, ſolves it thus.

Firſt, by Trigometry, I find the Angle B = 36° 52′ (ſee ſame Fig.) and the Angle A = 53° 8′, therefore by multiplying the Degrees of the Arches DE, EF and FD by ,0087267 I find the Length of each to be 21,99; 25,13; and 15,708 reſpectively. Conſequently the Area of the Sector E*m*F = 110,712; D*n*E = 124,908; and D*r*F = 78,54. Therefore if theſe Areas be ſubtracted from 300, 220; and 100; the Remainders will be 175,092; 89,283; and 21,46 = the Areas of the three angular Pieces required.

Meſſrs. *Buddles*, *Crabtree*, *Drury*, *Foſter*, *Goodbread*, *Guthrie*, *Harris*, *Harrington*, *Hartley*, *Metcalfe*, *Reed*, *Robinſon*, *Rowe*, *Stone* and *Ward*. favoured us with good Solutions to the above, which Room will not conveniently permit us to publiſh; therefore proceed to the Solution of Queſt.

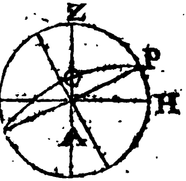
By Mr. *John Metcalfe*, of *Wentworth Houſe*.

If the Sun's Declination equal its diſtance from the 6 o'Clock Meridian, which (if I underſtand the Queſtion right) is the Propoſers meaning; their Sum in the prime-vertical cannot be preciſely equal to the Latitude on any Part of the Earth: For, at the Sun's greateſt Declination when the Sum approaches neareſt to that Equality, the Latitude exceeds the Sum 30′ 25″ $\frac{2}{3}$. If this Approximation be ſufficient; then the Latitude will be 47° 28′ 25″ $\frac{1}{3}$, and the Time *June* 21 D. 7h. 33′ 56″ A. M.

The ſame anſwered by Mr. *William Kingſton* of *Bath*.

Let x and y = Sine and Coſine of the Sun's Declination, = thoſe of the Time from 6. Then, by the Problem, $2xy$, and y^2-x^2 = Sine and Coſine of the Latitude; and (by *Spherics*) as $1 : \frac{y^2-x^2}{2xy} :: \frac{x}{y} : x$, $\therefore x = \frac{y^2x-x^3}{2y^2}$; but $y^2 = 1-x^2$; whence it becomes, $x = \frac{1-2x^2}{2-2x^2}$ $\therefore 1-2x^2 = 2x-2x^3$ $\therefore 1 = 2x+2x^2-2x^3$ $\therefore \frac{1}{2} = x+x^2-x^3$. Solved gives $x = ,403014 = 23^\circ\ 46'\ 5''$. But this is greater than the Sun's greateſt Declination, and therefore impoſſible.

The ſame anſwered by Mr. *Steph. Hartley*.



Let x and y = Sine and Coſ. of ⊙P = the Sun's Diſtance from the North Pole (Rad. = 1) = (by Queſt.) Sine and Coſ. of ⊙PZ. Then (by Queſt.) $2xy$, and x^2-y^2 = Sine and Coſ. of PH. Hence by common *Spherics* $1 : 2xy :: x : x^2-y^2$ $\therefore$ by Subſtitution $y+y^2-y^3 = \frac{1}{2}$. Reduced, y = the Sine of 23° 46′ nearly; not poſſible by the preſent Aſtronomy. But, if $2xy$ be put = ZP = the comp. of the Lat. ſought, we have (by *Spherics*) $2xy : x :: y : \frac{1}{2}$ = the Sine of A⊙ [illegible] = the Sine of ⊙Z. Then $1 : x :: x : \overline{\frac{3}{4}}\big|^{\frac{1}{2}}$ $\therefore x^2 = \sqrt{\frac{3}{4}}$ $\therefore x = ,9306$ the Sine of 68° 31′ nearly, from which the reſt is eaſily determined.

The ſame anſwered by Mr. *Tho. Robinſon*, the *Propoſer*.

Let x and y = Sine and Coſ. of the Time from 6 o'Clock, as alſo = the Sun's Declination, $2xy$ = Sine Latitude of the Place; y^2-x^2 = Coſine; then $\frac{y^2-x^2}{2xy}$ = Cotangent of th

Latitude, by *Spherics*, as $\frac{x}{y} : 1 :: x : \frac{y}{1}$ = Cotang. Latitude. Then $\frac{y^2-x^2}{2xy} = \frac{y}{1}$ ∴ $y^2 - 2xy^2 = x^2$, then will $y^2 = \frac{x^2}{1-2x} = 1-x^2$. Hence $x^2+x-x^3 = \frac{1}{2} = ,50000$ and $x = ,39699$ = 23° 23' = the Sun's Declination. Anſwering to *June* 16 Day, the Time that the Sun was due Eaſt 32 min. paſt 7 o'Clock, and the Lat is 46° 46' *North*.

Mr. *John Buddles* brought out the very ſame Solutiou as Mr. *Robinſon*'s.

(4) Queſt. 189. Anſwered by Mr. *John Buddles*, of *Cheſter-le-Street*.

Put b = Co Declination, rad 1. x = Sine $\frac{1}{2}$ Sum of ☉ Altitude and Azimuth; y = Coſine, s = 28° 21' the Sine of $\frac{1}{2}$ their Difference; q = Coſine. Then $sq+qx$ = Sine Azim. and $qx-sy$ = Sine Altitude at 6; $qy+sx$, the Coſine. Then by *Spherics*, as $1 : qy+sx :: sy+qx : b$; this properly reduced, we get $2xy = ,99856$; hence the Latitude is 51° 32' N. and Altitude at 6 = 18° 11'. Q. E. D.

The ſame anſwered by Mr. *Tho. Robinſon*.

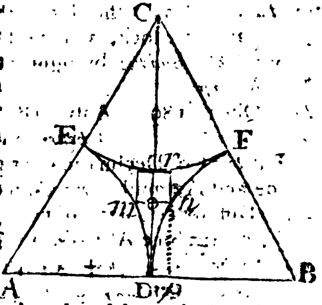
Put b = 66° 31' Comp. Sun's Declination; rad. = 1; and let x and y = Sine of $\frac{1}{2}$ Sum and Coſine of the Sun's Altitude and Azimuth. Alſo s = 28° 21' the Sine of $\frac{1}{2}$ their Difference, and q = Coſine: then (by *Spherics*) $sy+qx$ = ☉ Azimuth from the North Eaſterly, and $qx-sy$ = the Sun's Altitude at 6 o'Clock; $qy+sx$ = Coſine. Again (by *Spherics*) $1 : qy+sx :: sy+qx : b$ ∴ $qsy^2+s^2xy+q^2xy+sqx^2=b$. Now $y^2+x^2=1$; and $s^2+q^2=1$; then, in the laſt Equation we have $xy=b-sq=,49928$; but $2xy=,99856$ = the Nat. Sine 86° 56' and 180°−86° 56' = 93° 4' ÷ 2 = 46° 32' = the $\frac{1}{2}$ Sum of the Sun's Altitude and Azimuth. Then 46° 32 + 28° 21' = 74° 53' the Sun's Azimuth from the North, the Sun's Altitude is 18° 11' and the Latitude is 51° 32 North.

Mr. *Henry Green* ſolves the ſame Queſtion thus.

Put s and q = the Sine and Coſine of $\frac{56° 42'}{2} = 28° 21'$; c = the Coſine of 23° 29' (Rad = 1) x and y = the Sine and Coſine of $\frac{1}{2}$ the Sum of the Sun's Altitude and Azimuth at 6; then will $qx+sy$ = Sine, and $qy-sx$ = Coſine of the Az. from North; and $qx-sy$ = Sine, and $qy+sx$ = Coſine of Alt. Then, by a known *Theorem*, we ſhall have $cqx+sy=qy+sx$, and $x^2+y^2=1$. Conſequently by Subſtitution and Reduction $2xy=2c-2sq$, whence the Lat. is found 51° 32. Q. E. I.

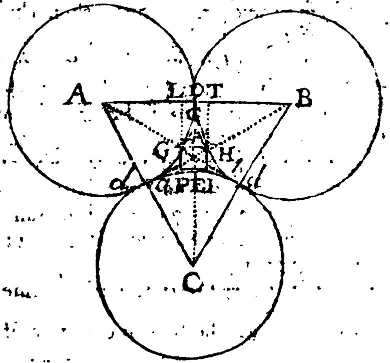
Meſſrs. *Barker*, *Goodhead*, *Hartley*, *Holroyd*, *Hudſon*, *Stone*; and ſeveral other of our worthy *Contributors* favoured us with good Solutions to this Queſtion, but we preſume the above are ſufficient.

(5) Queſt. 190. Anſwered by Mr. *John Goodhead* of *Nottingham*.



Let DEF repreſent the given curvilineal Triangle, *mrn* the required Parallelogram; put the Radius of the given Circles $=20=r$; $14,64=Dr=a$; and $x=mo=no$. Then, from the Property of the Circle, we have $\sqrt{2rx-x^2}=pn=Do$, and $a-\sqrt{2rx-x^2}=ro$, conſequently $2ax-2x\sqrt{2rx-x^2}$ is a *Max*: in Fluxions it is $a\dot{x}-\frac{3rx\dot{x}-2x^2\dot{x}}{\sqrt{2rx-x^2}}=0$. Which reduced and brought into Numbers is $x^3-60x^2+933,5824x=2143,296$. Hence $x=2,67596$, $ro=4,641$; and Area $=24,83826$.

The ſame anſwered by Mr. *William Kingſton* of *Bath*.

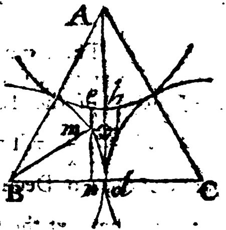


To the Points of Contact *d*, *d*, and D draw DC, A*d* and B*d*, which biſſect the Angles of the Triangle ABC, and are perpendicular to the Sides; draw the Tangents *ab*, *ac* and *bc*; which will form the equilateral Triangle *abc*.

Now, the greateſt Parallelogram that can be inſcribed in the curvilineal Triangle *d*D*d*, will be equal to the greateſt Parallelogram that can be inſcribed in the equilateral Triangle *abc*, the Altitude of which is known to be $=\frac{1}{3}$ the Altitude of the Triangle. Now in the Triangle BHT are known all the Angles, and Side BI; from whence are found $TH=10$, and $BT=17,3205$ and $DT=BD-BT$

the ſame we find DC=34,641. Whence alſo DC—CE—DF (=TH) =EF=IH=PG=4,641. Then the Area is found=24,87112.

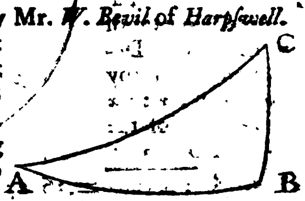
The ſame anſwered by Mr. *Robert Williams*, of *Honiton*, *Devonſhire*.



Join the three Centers A, B, C, of the three Circles, then it is evident the three Sides will paſs through the three Points of Contact, and the △ ABC, is equilateral, and each Side equal the Diameters of the given Circle=40. By *Trigonometry*, &c. *bd* is found=14,641. Draw *en* parallel to *bd*; and let the Radii B*n* =B*d*=20=*r*; *bd*=*en*=14,641=*a*; *be*=*mo*=*nd*=*x*= half the Parallelogram's Length, then $r-x=$ B*n*. by (47. E. 1) $\overline{2rx-xx}|^{\frac{1}{2}}=nm=od$, and $a-\overline{2rx-x^2}|^{\frac{1}{2}}=me$ $=bo$, the Parallelogram's Breadth, $\times 2x=2ax-\overline{2rx^3-x^4}|^{\frac{1}{2}}$ $=m$, which is to be a *Maximum*. In Fluxions $a\dot{x}-\frac{3rx^2\dot{x}-2x^3\dot{x}}{\overline{2rx^3-x^4}|^{\frac{1}{2}}}=0$. Reduced $4x^3-12rx^2+9r^2x+a^2x$ $-2a^2r=0$. And $x=2,68$; $2x=5,36=$ the Length; 4,641 = the Breadth; and the required Area = 24,8704. W. W. D.

Meſſrs. *Buddles*, *Coram*, *Crabtree*, *Eaton*, *Hartley*, *Holroyd*, *Hudſon*, *Robinſon*, and others, favoured us with Anſwers to this Queſtion, as appears in the Catalogue of Contributors at the End.

(6) Queſt. 191. Anſwered by Mr. *W. Bevil* of *Harpſwell*.



In the annexed Figure, let AC denote the Complement of the Sun's Declination; AB the Latitude; the Angle A the Time of the Sun's riſing =5½ Ho.=82° 30′. Alſo let x=Coſ. BC, y=Sine<C, and a=Coſine<A; then $x:y$:: Fluxion AC : Fluxion AB; and by *Trigonometry*, y : [illegible] (Rad.) :: [illegible] $=a$, or $y=\frac{a}{x}$; which being put for y in the Analogy above, we have $x:\frac{a}{x}$ :: Fluxion AC : Fluxion AB; but the Fluxion AC—the Fluxion AB=0, when a *Maximum*, therefore Fluxion of AC = Fluxion AB; whence it is evident

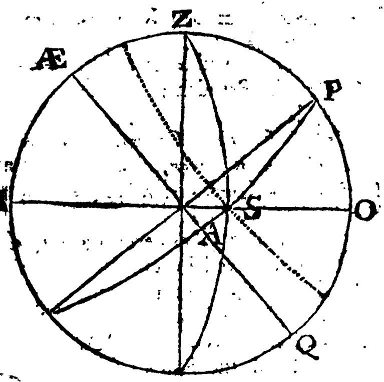
that $x : \frac{a}{x} :: 1 : 1$ ∴ $x^2 = a$. Whence $x = a^{\frac{1}{2}} =,361284098$.

Therefore AC=70° 8′ 8″ 34‴ the Coſine of the Sun's Declination; and AB=9° 51′ 51″ 26‴ the Sine of the Latitude; which ſhews the Latitude and Declination are equal.

The ſame anſwered by *Tabularius*.

Put s = Sine 7° 30′ the given aſcenſional Difference; and x = Tangent of the Latitude; then, by *Spherics*, Radius $= 1 : s :: \frac{1}{x} : \frac{s}{x}$ = Tang. of the Declination, ∴ $\frac{x}{s}$ = Tang. of the Co. Declinat. Whence $\frac{x - sx}{s + xx}$ = Tang. of the Difference betwixt the Co. Declination and the Latitude; and ∴ $\overline{x - sx} \times s + \overline{x^2 - 2x} \times x\,s - x = 0$; from which $x = s^{\frac{1}{2}}$ ($= \frac{s}{x}$) =,361284 = Tang. 19° 51′ 50″ = the Latitude, and alſo the Declination anſwering to the 20 Day of *May*, and 24 of *July*.

The ſame anſwered by Mr. *John Hudſon*, of *Louth*.



It is evident that when PS=PO is a *Maximum*, that PO—SA will be a *Minimum*; which muſt be when they are equal, or their Difference nothing; this being premiſed, put x = the Tangent of the Latitude = Declination. Then (by *Spherics*) $1 : x :: x : c$ = Coſine of the Angle SPO ∴ $x = \sqrt{c} = \sqrt{,1305262} =,3612702$ anſwering to 19° 51′ 47″ = the Latitude; and the Days are *May* 19, and *July* 24.

The ſame anſwered by Maſter *W. Hutchinſon*, at Mr. *Allen's* School in *Spalding*.

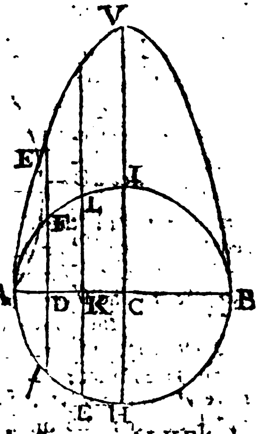
Let x = the Tangent of the required Latitude, a = Sine of the Sun's aſcenſional Difference; Rad. = 1, then will $\frac{x}{a}$ = Co-Tangent of his Declination: and (by the Queſtion)

$\frac{x - ax}{a + xx}$ will be a *Maximum*: Solved $x = \sqrt{\frac{a - aa}{1 - a}} = \sqrt{a} =$,361284 the Tangent of 19° 51′ 59 = the required Latitude = Declination North, and anſwering to *May* the 19 and *July* 24. W. W. R

Anſwered alſo by Mr. *Tho. Harris.*

Put x = Tang. of Lat. and c = Coſ. of the Hour <; then (by *Spherics*) $c : 1 :: x : \frac{x}{c}$ = Cotan. of the Sun's Decl. then (by *Trig.*) $1 + \frac{x^2}{c} : 1 :: \frac{x}{c} - x : \frac{x - cx}{c + x^2}$ = Tang. of the Diff. a *Max.* which, fluxed and reduced, gives $x = \sqrt{c}$ = ,36128 = 19° 51′ 50″ the Lat. = the Declination on the 20 of *May*, and 24 of *July*.

(7) Queſt. 192, anſwered by Mr. *Thomas Coram*.

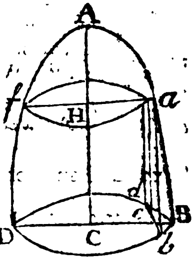


Firſt, I find the Solidity of the Hay-rick to be = 14137,2000. Then as VC = 40 : □ AC = 15 :: Difference of the Sections = 12 : □ DC = 8,2158, which ſubſtract from AC, gives AD = 6,7842. Then in the Paraboloid AEVBHE*f*, we have

Given { AD = 6,7842
AB = 30, To find
VC = 40,

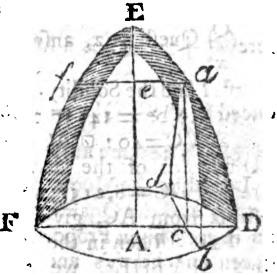
the Content of the Segment AEFD*f*. Then, as AC : DC :: 2DC : BK which I find = 9 nearly; Then by a Propoſition of Sir *Iſaac Newton's* (viz.) 8 Times the Area of the Circular Segment AFD*f*, leſs the Area of the Segment ALKE (taken out of the Area of the Circle (viz.) the Area EKLIBHE) multiplied by $\frac{1}{12}$ of VC is = the Content of the Segment AEFD*f* in the Paraboloid. Which is = 1435,1067, which ſubtracted from 14137,2000 gives the Difference = 12702,0033.

The ſame ſolved by Mr. *Thomas Barker.*



Put $a = BD = 30$; $b = HC = ac = 28$; $c = AH = 12$; $d = 0{,}3927$, and $x = fa$; Then $cdx^2 =$ Solidity of the Conic-Section, and $a^2 + x^2 \times bd =$ Solidity of the Fruſtum: Whence $cdx^2 + \overline{a^2 + x^2} \times bd = S$. (Whence alſo 14137,2 Feet the Hay-Stack's Solidity) $\therefore x = \sqrt{\frac{S - a^2bd}{\overline{b+c} \times d}} = 16{,}43$. Then $BC = 23{,}215$ and $DcD = 6{,}785$, which being obtained $dc = bc$, may be eaſily found, and is 12,55; whence the Difference of their Solidities was 11270,6 Feet nearly. Q. E. D.

The ſame anſwered by Maſter *William Holmes*, a Scholar of Mr. *Cha. Wildbore*, at *Watnall* School, *Nottinghamſhire.*



Let FED repreſent the given Hay-ſtack, whoſe Solidity is 14137,2 Feet, and *aD bd* the *Slice*, or Part cut off; then *ac* being given = 28, E*e* will be 12; and by the Property of the Parabola $AE : AD^{\square} :: Ee : ea^{\square}$; whence $ea = Ac = 8{,}21$; and $dc = \sqrt{Fc}\,\sqrt{cD} = 12{,}5537$ and $\frac{AD^{\square}}{2dc^{\square}} \times \text{Area } dDb - \frac{1}{3} dc \times Ac \times ac = 1428{,}3724$; the Solidity of *aDbd*; whence the required Difference is found $= 11380{,}4442$ Feet.

Meſſrs. *Barnett*, *Eaton*, *Goodhead*, *Hartley*, *Kingſton*, *Meſhan*, *Stott*, and ſeveral others, anſwered this much in the ſame Manner as the above, whom we will oblige elſewhere.

(8) Queſt. 193, anſwered by Mr. *William Kingſton* of *Bath.*

Given $y^4 - y^2x = x^3$; $c = 10637{,}45$. Let $vy = x$, and we have $y^4 - vy^3 = v^3y^3$ $\therefore y - v = v^3$ $\therefore y = v^3 + v$, and $x = yv = v^4 + v^2$, the Fluxion of $\dot{y} = 3v^2\dot{v} + \dot{v}$ $\therefore \dot{y}^2 = 9v^4\dot{v}^2 + 6v^2\dot{v}^2 + \dot{v}^2$; and of $\dot{x} = 4v^3\dot{v} + 2v\dot{v}$; $\therefore \dot{x}^2 = 16v^6\dot{v}^2 + 16v^4\dot{v}^2 + 4v^2\dot{v}^2$; Whence $\dot{c} = \sqrt{\dot{x}^2 + \dot{y}^2} = \dot{v}\sqrt{16v^6 + 25v^4 + 10v^2 + 1}$ whoſe Fluent gives $v = 10$. Hence $y = v^3 + v = 1010$; and $yv = 10100$. But notwithſtanding thoſe are the true Values of x and y, as is evident from the given Equation $y^4 - y^2x = x^3$, yet they will give but 10150,37375: Therefore I preſume the Propoſer has made a miſtake in the number 1063,745.

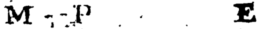
The ſame anſwered by Mr. *Tho. Crabtree*, the Propoſer.

Put $v = x$ in the given Equation, and it is $y = v^3 + v$, and $x = v^4 + v^2$; in *Fluxions* $\dot{x} = 4v^3\dot{v} - 2v\dot{v}$; and $\dot{x}y = 4v^6\dot{v} + 6v^4\dot{v} + 2v^2\dot{v} =$ the Fluxion of the Area, whoſe Fluent is $\frac{4v^7}{7} + \frac{6v^5}{5} + \frac{2v^3}{3} = 10637{,}745 = a$; which reduced gives $v = 4$; conſequently $x = 68$, and $y = 272$.

(9) Queſt: 194, anſwered by Mr. *Henry Green*.

Let $Q =$ the Quantity of Matter in the Earth; q that in the Moon; a the Diſtance of their Centers, and $x =$ the Diſtance of the required Point from the Earth; then $a - x$ = its Diſtance from the Moon; Conſequently $\frac{Q}{x^2} =$ the Earth's Attraction, and $\frac{q}{\overline{a-x}|^2}$ = that of the Moon therefore $\frac{Q}{x^2} + \frac{q}{\overline{a-x}|^2}$ is a Minimum which in Fluxions and reduced is $q^{\frac{1}{3}}x + Q^{\frac{1}{3}}x = Q^{\frac{1}{3}}a$; and $x = \frac{Q^{\frac{1}{3}}a}{q^{\frac{1}{3}} + Q^{\frac{1}{3}}}$. W.W.R.

The ſame anſwered by Mr. *William Bevil*.



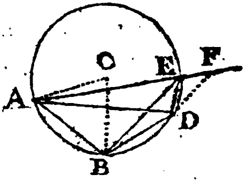
Let M be the Moon, and E the Earth, and the Quantity of Matter in each be in Proportion as 1 is to q; d the Diſtance between the Earth's and Moon's Centers; put $x = Ep$, then $d - x = Mp$, and will $\frac{q}{x^2} + \frac{1}{\overline{d-x}|^2}$ be a *Minimum*; which in *Fluxions* is $-\frac{2qx\dot{x}}{x^4} + \frac{2d\dot{x} - 2\dot{x}x}{\overline{d-x}|^4} = 0$; Or $\frac{-q}{x^3} + \frac{1}{\overline{d-x}|^3} = 0$; Then $x = \frac{dq^{\frac{1}{3}}}{1 + q^{\frac{1}{3}}} =$ the Diſtance from the Earth, and $\frac{d}{1 - q^{\frac{1}{3}}}$ = the Diſtance from the Moon where the Body may be placed to have the leaſt Attraction.

The ſame anſwered by *Aſtronomus* the Propoſer.

Q, and q, as the Maſſes of the Moon and Earth; a the Diſtance of their Centers; x, the Diſtance of the required Point from the Earth's Center. Then (by Art. 382. *Simpſon's* Fluxions) $\frac{Q}{xx}$ is as the Earth's Attraction at the Diſtance x, and $\frac{q}{\overline{a-x}^2}$ that of the Moon; wherefore $\frac{Q}{xx}+\frac{q}{\overline{a-x}^2}$ is a Minimum, and $\frac{-2Qx\dot{x}}{x^4}+2q\times\frac{\overline{a\dot{x}-x\dot{x}}}{\overline{a-x}^4}=0$. Therefore $q\times\frac{1}{\overline{a-x}^3}=\frac{Q}{x^3}$; or $q^{\frac{1}{3}}x=Q^{\frac{1}{3}}a-Q^{\frac{1}{3}}x$; Whence $x=\frac{Q^{\frac{1}{3}}a}{Q^{\frac{1}{3}}+q^{\frac{1}{3}}}$; where writing for Q, and q, the Quantities of Matter in the Earth and Moon reſpectively, the Diſtance x from the Earth's Center will be had.

(10) Queſt. 195, anſwered by *Tabularius*.

CONSTRUCTION.



In a right Line, drawn at Pleaſure, take AF = AB + BD (=12) and make the ∠AFD = ADB = DAB; and on A, as a Center, with a Radius = 10 deſcribe an Arch cutting FD in D, and draw AD; alſo, on A and D, as Centers, with a Radius = 6, deſcribe two Arcs interſecting each other in B, and draw AB, and BD; then draw BC biſſecting AD, and make the ∠CAB = CBA, and on C deſcribe the Circle ABD, in which draw the Chords DE, BE; and BE will be the Diagonal required.

DEMONSTRATION.

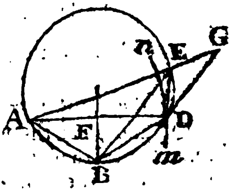
The ∠AFD = ADB = DAB, and AF = AB + BD by Conſtruction, and becauſe ABDE is inſcribed in a Circle, the ∠DEF = ABD (22 E. 3.) ∴ EDF = DFE, and ∴ DE = EF (6. E. 1.) and conſequently AE + ED = AB + BD.

CALCULATION.

In the △AFD are given AF, AD, and the ∠AFD = 33° 33′ 26″, to find the ∠DAF = 7° 59′ 48″; whence the ∠BAE = 41° 33′ 14″; and, becauſe the ∠AEB = ADB (21. E. 3.) in the Triangle AEB are given all the Angles and the Side AB, to find BE = 7,2. and alſo AE = 10,49 ∴ ED = 1,51.

The ſame anſwered by Mr. *W. Kingſton*.

CONSTRUCTION.



Make AG = AB + BD = 12, make the ∠DGE = half the Compliment of the Angle ABD, and draw DG; then with a Radius = 10, and one foot in A, deſcribe the Arch nm, cutting DG in D; join AD, make the ∠BDG = DGD, biſſect AD in F by the perpendicular BF; draw BE parallel to DG cutting BF in B; join AB, and BD, and the thing is done.

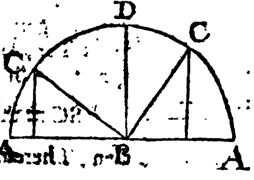
DEMONSTRATION.

By Conſtruction GDE = DGE = the Compliment of the ∠ABD to a Semicircle (by 22. El. 3) the ∠BED = DGE = half the Angle AED,

CALCULATION.

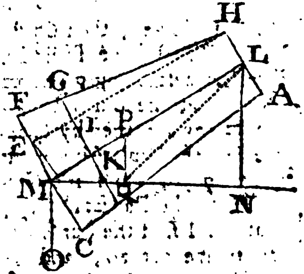
In the $\triangle ADG$ are given $AG = 12$; $AD = 10$; and $\angle AGD = 33°\ 33'\ 30''$ from whence are found the $\angle ADG = 108°\ 26'\ 40''$. $DAG = 7°\ 59'\ 50''$, then in the $\triangle ABE$ are known all the $\angle$s and Side AB; whence BE is found $= 7,2$; and $AE = 10.4895$, alſo $DE = 1,5106$.

(11) Queſt. 196, anſwered by Mr. *Steph. Hartley*.



Let BC, BD, BC, repreſent the Axis of the Conic's Fruſtum, in as many different Inclinations to AB the Horizontal one. In Page 32 of the GENT. DIARY for 1751, there is this Proportion (viz.) As the Sum of both the Circular Areas, or Ends of any given Conic's Fruſtum, is to its whole Weight; : So is the Area at either End of the Fruſtum: to its reſpective Preſſure upon the Supporter in an Horizontal Poſition.—Again, that the Weight of either End, while it is riſing, decreaſes as the even Degrees of a Circle (conſequently the other increaſes in the ſame Ratio) and not as the Sines or Chords. Hence, from the Data of the Queſtion, and the above, the Weight upon each of the Supporters at any given Inclination to the Horizon may be determined.

The ſame anſwered by *Aſtronomus*, the Propoſer.

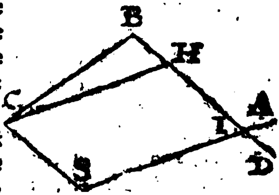


Let OM, and NL be the two Supporters. Put the Length $HE = a$, Diameter greater End $CF = c$, and HA, that of the leſſer $= d$; call EF, n; $HI = LK$, x; Then, by Sim. Triangles $a : x :: n : \frac{nx}{a} = GI$. $\therefore \frac{2nx + da}{a} = GB$; and

$$\frac{\text{Fluent } 4n^2x^3\dot{x} + 4danx^2\dot{x} + d^2x\dot{x}}{\text{Fluent } 4n^2x^2\dot{x} + 4danx\dot{x} + d^2a^2\dot{x}} = LP,$$

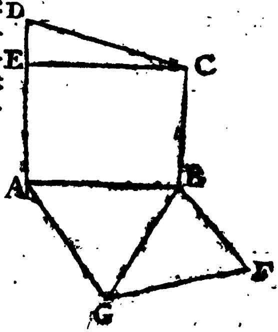
or the Diſtance, the Center of Gravity P, is from the extreme Point of the Axis L. But by taking the Fluents of the above Expreſſion we have $\frac{6n^2x^3 + 8danx^2 + 3d^2a^2x}{8n^2x^2 + 12danx + 6d^2a^2}$; which, when $x = a$, becomes $\frac{6n^2 + 8an + 3d^2}{8n^2 + 12dan + 6d^2} \times a = LP$. Now let QP (perpendicular to the Horizon MN) paſs through the Center of Gravity P; and let QL be drawn. Then, by *Mechanics*, $MQ : QL ::$ Preſſure at L : Preſſure at M; which (ſince MP, and the $\angle QMP$ are given) are readily found.

(12) Queſt. 197, anſwered by Mr. W. *Bevil.*



Let a, and b, be the Sine and Coſine of the Sun's Altitude at Six; v = the Height of the higheſt Tower, then will $\frac{b-a}{b} = v$ = the Height of the loweſt Tower c = the Cotangent of the Sun's Altitude at Ten, then cv = IB the Length of the Shade of the higheſt Tower at Ten; and $\frac{b-a}{b} \times cv$ = SC = the Length of the Shade of the loweſt Tower at Ten; Therefore $cv - \frac{b+a}{b} \times cv = \frac{acv}{b}$ = HB, put p, = the Coſine of AID = HIS = BHC (ſuppoſing CH parallel to IS) the Difference of the Sun's Azimuth at Six and Ten; then, by *Trig.* $\overline{HC}^2 + \overline{HB}^2 - \overline{HC \times HB} \times 2$ Coſine $\angle H = \overline{BC}^2 = v^2 + \frac{a^2c^2v^2}{b^2} - \frac{2pacv^2}{b} = \overline{85,666}^2 = q^2$. Whence $v = \frac{bq}{\sqrt{b^2 + a^2c^2 - 2pabc}}$ = 97,0156 Yards the higheſt Tower; then 66,63 Yards is the loweſt.

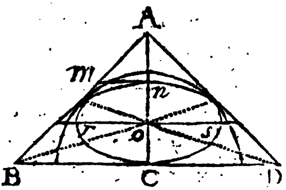
The ſame anſwered by Mr. *J. Holroyd.*



The Latitude being given = 53° 15′, and the Sun's Declination = 22° 2′; then by *Spherics*, I find the Sun's Altitude at 6 to be 17° 29′, and it's Azimuth from the Eaſt = 13° 37′; alſo at 10 I find the Sun's Altitude to be 51° 20′, and its Azimuth from the North = 132° 6′. Then in the Triangle DCE, ſuppoſe EC = DA (= the Height of the higher Tower = 100.) And the ∠DCE = 17° 29′ = the Sun's Altitude at 6 to find DE = 31,35, which taken from DA leaves AE = CB = 68,65 = the Height of the lower Tower; alſo by *Trig.* I find AG the Length of the Shadow of the higher Tower = 80,02; as alſo CB = 68,65 the Length of the lower Tower Shadow: Then in the Triangle ABG, there are given AB, and AG; and the ∠GAB = 55° 43′ = the Diff. of the Azimuth's from the North, to find BG = 85,95. Alſo in

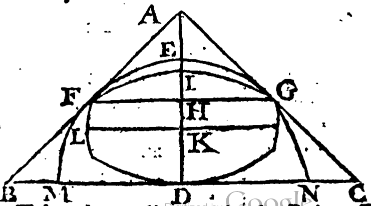
= 70° 00½ to find FG = 85,66. Therefore, as 88,33 : 85,66 : : 100 : 96,97 = the true Height of the greater Tower, and alſo 66,42 = the Height of the leſſer Tower. Q. E. I.

(13) Queſt. 198, anſwered by *Tabularius*.



On the Center C, erect CA perpendicular to the Diameter produced to B and D, making BC = CD; and parallel thereto draw the Tangent *mn*, and the tranſverſe Axis *rs*; and let AB and AD be Tangents to the Semicircle and Elipſis, in the ſame Points. Put *x* and *y*, for the Sine and Coſine of the ∠BAC, Radius = 1; and C*n* = *v*; then will $AC = \frac{1}{x}$; $BC = \frac{1}{y}$; $An = \frac{1-vx}{x}$; and by ſimilar Triangles $mn = \frac{1-vx}{y}$; and by the Nature of the Elipſis $ro = os = \sqrt{\frac{1-vx}{y}}$; whence $v\sqrt{\frac{1-vx}{y}}$, or $\frac{v^2 - xv^3}{y^2}$ is a *Maximum*, and $y^2 \times \overline{2v\dot{v} - 3xv^2\dot{v} - v^3\dot{x}} - 2y\dot{y} \times \overline{v^2 - xv^3} = 0$; from which $y^2 \times \overline{2v\dot{v} - 3xv^2\dot{v}} = 0$; and $v = \frac{2}{3x}$; alſo $2v^2x\dot{x} - 2v^3x^2\dot{x} - y^2v^3\dot{x} = 0$ (putting $\frac{-x\dot{x}}{y}$ for $\dot{y}$;) and $v = \frac{2x}{2x^2+y^2} = \frac{2x}{3x}$ ∴ $x = y$ = Sine 45° = $\sqrt{2}$; Hence $v = \frac{2\sqrt{2}}{3}$ = ,942808; and $rs = 2\frac{\sqrt{2}}{3}$ = 1,632993; the Dimenſions required. *Cor.* $Cn : rs :: \sqrt{3} : 3$. And the Area of the Semicircle : Area of the Elipſis : : $3\sqrt{3} : 4$. Alſo the Triangle ABD having all its Sides biſected by the Points of Contact is the leaſt that will circumſcribe the Elipſis.

The ſame anſwered by Mr. *Charles Wildbore*.

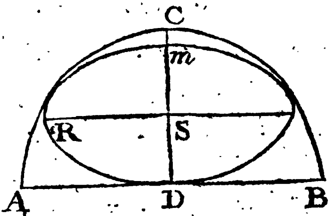


Let MEN be the given Semicircle, and BAC its leaſt circumſcribing Triangle; then it is well known that the greateſt Semicircle Elipſis, Parabola, Parallelogram, &c. that can be inſcribed in this Triangle, will meet in the Points F and G, ſo that AH = HD; and (by Property of the Fig.) $AD = \sqrt{2}$; and $AH \times HK = IH \times HD$; wherefore $IH = HK$, and $ID = \frac{2\sqrt{2}}{3}$ the conjugate Axis: Then $\frac{1}{3}HD^2 : FI^2 (HD) :: IK^2 (\frac{4}{3}HD^2) : LK^2 = \frac{4}{3}HD^2 = \frac{2}{3}$; whence $LK = \sqrt{\frac{2}{3}}$ = the Semitranſverſe Axis.

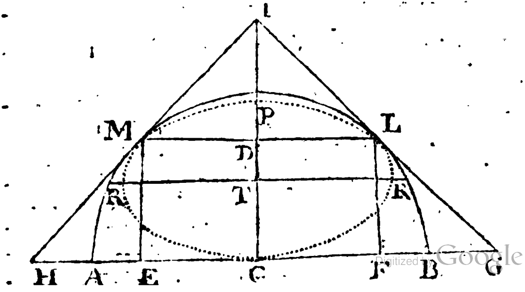
* This is demonſtrated at p. 504 of *Simpſon's* Fluxions.

The ſame anſwered by Mr. *John Goodhead.*

If the Semitranſverſe of the Elipſis = T; Semiconjugate = C; Radius = R; I ſay, that the Square of the Semitranſverſe is a mean Proportional, between the Difference of the Squares of the Semidiameters and Square of Radius; that is $\overline{RS}|^2 - \overline{SD}|^2 : \overline{RS}|^2 :: \overline{RS}^2 : \overline{CD}^2$ which in Symbols is $\overline{T}|^2 - \overline{C}|^2 : T^2 :: \overline{T}|^2 : \overline{R}|^2$; whence by multiplying the Extremes and Means (R being = 1) we have $\frac{T^2}{\sqrt{T^2 - C^2}} = 1$. Therefore $C = \sqrt{T^2 - T^4}$. Conſequently $T\sqrt{T^2 - T^4}$ is a Maximum, its Square is a Maximum too (viz. $T^4 - T^6$.) In Fluxions it is $4T^3\dot{T} - 6T^5\dot{T} = 0$. Reduced $T = \frac{2}{6}|^{\frac{1}{2}} = ,816496$; and $C = ,471416$; Whence the Diameters are to one another as $\frac{4}{6}|^{\frac{1}{2}} : \frac{8^{\frac{1}{2}}}{3}$.



The ſame anſwered by Mr. *William Kingſton.*



Let $x = FL$, then $CF = \sqrt{1-x^2}$; and, $\sqrt{1-x^2} : x :: \frac{x^2}{\sqrt{1-x^2}} = FG$, and $\frac{x^2}{\sqrt{1-x^2}} + \sqrt{1-x^2} = \frac{1}{\sqrt{1-x^2}} = GC$, and as $\frac{x^2}{\sqrt{1-x^2}} : x :: \frac{1}{\sqrt{1-x^2}} : \frac{1}{x} = CI$; and $\frac{1}{x} \times \frac{1}{\sqrt{1-x^2}} = \frac{1}{x\sqrt{1-x^2}} =$ the Area of the leaſt Triangle that will circumſcribe the Semicircle, and in Fluxions is, after being reduced, $2x^3\dot{x} - x\dot{x} = 0 \therefore x = \sqrt{\frac{1}{2}} = ,7071$, whence $CI = 1,4142$. Let $y = DP$, $c = ,7854$; then $\frac{x+y}{2} = TC = TP$, and, by the Property of the Curve, as $xy : xx :: \frac{\overline{x+y}^2}{4} : \frac{x}{4y} \times \overline{x+y}^2 = \overline{TR}^2 \therefore KR = \overline{x+y} \times \sqrt{\frac{x}{y}}$, and the Area $= \overline{x+y}^2 \times c\sqrt{\frac{x}{y}}$, a Maximum and in Fluxions is $6x^2y^2\dot{y} + 8xy^3\dot{y} + 3y^4\dot{y} - x^4\dot{y} = 0$. Solved, gives $y = ,2357$; whence $x+y = ,9428 = PC$ the Conjugate, and $\overline{x+y} \times \sqrt{\frac{x}{y}} = 1,633$ the Tranſverſe $= KR$; and the Area $= 1,189096$.

(14) Queſt. 199, anſwered by Mr. *Charles Wildbore.*

I am informed that this Queſtion is miſprinted (viz. $3\surd$ inſtead of $\sqrt[3]{}$ correcting which we have $\frac{323x+30361}{7107} = y^3$. Now as $\overline{323x+30361}$ is diviſible by 7107, this multiplied by 22, or $7106x + 667942$; alſo $7107 - 7106x - 66794 = x - 93 - \frac{6991}{7107}$; and $x - \frac{6991}{7107}$ muſt all be diviſible by 7107, and conſequently $x = 7107n + 6991$ (where n is a whole Number.) This being ſubſtituted for x, the Original Equation becomes $323n + 322 = y^3$ a Cube Number. Let $322 = b$, and this Equation becomes $\overline{b+1} \times n + b$; Now, in order to have this a Cube Number, let $y = rb + r - 1$ (where r is an Integer) this Cube leſſened by b, and divided by $b+1$, gives $n = \overline{b+1}^2 \times n^3 - 3r^2 \times \overline{b+1} + 3r - 1$; where it is manifeſt, that if r be a whole Number, n will be a whole Number alſo; and conſequently $rb + r - 1$, will be ſuch a Value of y, as ſhall give x a whole Number. Therefore, putting r equal to 1, 2, 3, 4, 5, 6, &c. the reſpective Values of y, they will be 322. 645. 968. 1291. 1614. 1937, &c. *ad infinitum*. The correſponding Values of x being eaſily found.

COROLLARY.

It may be obſerved that this only anſwers, when the Coefficient of n is $b+1$, which may be extended to theſe Caſes when the Coefficient of n is either $\overline{b+1}|^2 \times r^3 - 3r^2 \times \overline{b+1} + 3r - 1$; or $\frac{1}{c}$ (where c is a given Integer) the Value of n in the firſt Caſe, being $b+1$, and in the ſecond $cy^3 - cb$; (where y may be taken at Pleaſure.) But, if the Coefficient of n, be $\frac{d}{c}$ where both d and c are given Integers; then it will be neceſſary in order to have n a whole Number, that $\frac{cr}{d}$, and $\frac{3rc-c}{d}$ be Integers. Let $\frac{cr}{d} = v$, then will $\frac{3rc-c}{d} = \frac{3dv-c}{d}$; which ſhews that the Thing is impoſſible, unleſs c be ſome Multiple of d.

The ſame anſwered by Mr. *Tho. Moſs*, the Propoſer.

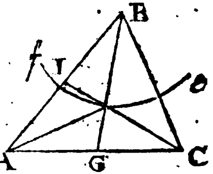
Wherein is a general Rule to ſolve it, or any other Queſtion of the like Nature.

Let the Coefficient of the indeterminate Quantity be called a; the abſolute Number b, and the Diviſor c; then if $\frac{c-1}{a}$, and $\frac{b+1}{a}$; are both whole Numbers; then, I ſay, that every Term of an Arithmetical Series (which is formed by dividing the abſolute Number by the Coefficient; and taking the Remainder of the firſt Term of the ſaid Series, and the ſaid Coefficient to be the common Difference) will be the Value of the Expreſſion a whole Number, ſo as to bring out the Value of x a whole Number. Whence it is evident, that the Six Values of the Expreſſion in whole Numbers are 322. 645. 968. 1291. 1614. and 1937. Therefore,

$$\text{When } \sqrt[3]{\frac{323x+30361}{7107}} \left\{ \begin{array}{l} =322 \\ =645 \\ =968 \\ =1291 \\ =1614 \\ =1937 \end{array} \right\} x = \left\{ \begin{array}{r} 734600725 \\ 5904225418 \\ 19957671181 \\ 47343735232 \\ 92511214789 \\ 159908907070 \end{array} \right.$$

The required Values in whole Numbers

(15) Queſt. 200. Anſwered by Mr. *Charles Wildbore*, the Propoſer.



Produce CD to I, and BD to G; and from B as a Center, with the Radius BD, deſcribe the Arc *fe*; Then the Momentary Celerities of the Point D, in the Directions AD and DC, being to each other as the Coſine of AD*f*, to the Coſine CD*e*; the Fluxions of the Lines AD and DC, will be truly repreſented by theſe Coſines divided by ſome conſtant Quantity d Conſequently the Fluxion of $\overline{AD}^{\pm n}$ will be $\pm n \times \overline{AD}^{\pm n-1} \times \frac{\text{Cos. AD}f}{d}$; and that of $\overline{DC}^{\pm n}$ will be $\pm n \times \overline{DC}^{\pm n} \times \frac{\text{Cos CD}e}{d}$; but when the Sum of theſe Powers is a Minimum, their Fluxions muſt be equal to each other; or, $\text{AD}^{\pm n-1} \times$ s. ADG $= \overline{DC}^{\pm n-1} \times$ ſ. BDI, and in the ſame manner it will appear, that $\overline{BD}^{\pm n-1} \times$ ſ. ADG $= \overline{CD}^{\pm n-1} \times$ ſ. ADI; and, $\overline{AD}^{\pm n-1} \times$ ſ. ADI $= \overline{BD}^{\pm n-1} \times$ ſ. BDI; and conſequently $\frac{s.\text{ADI}}{\text{BD}^{\pm n-1}} = \frac{s.\text{BDI}}{\text{AD}^{\pm n-1}} = \frac{s.\text{ADG}}{\text{DC}^{\pm n-1}}$. which holds univerſally.

CORROLLARIES.

1. If $n = 1$, then will the three Angles about the Point D be = each other.

2. If $n = 2$, then the three Triangles about the Point D are equal to each other, and this Point will be the Center of Gravity of the Triangle.

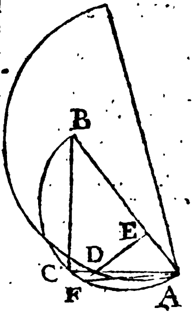
3. If $n = -2$, then will $s.\text{ADI} \times \text{BD}^3 = s.\text{BDI} \times \text{AD}^3 = s.\text{ADG} \times \text{DC}^3$. Which anſwers Queſtion 93, in *Martin's* Magazine.

Errata in the laſt Year's *Diary*; by Mr. *Thomas Moſs.*

In his own *Solution* to *Queſt.* 177, p. 23, l. 7. inſtead of, *m*F, read *m*G. L. 8, for *m*R read *mr*. In the Demonſtration l. 13, read $mr\ (=2mP) = mr \times \frac{Gm}{GF} \therefore QG \times QE \times \frac{Gm}{GF}$. L. 17, read Q*e* = QG. L. 19, read (∵ M*m* : *m*R : : IQ (QN) : QK.) Line the laſt in the Demonſtration, dele *s*.

REMARK. Mr. *Moſs* obſerves that his Solution to Queſt. 177, tho' ſtrictly true, is not ſo elegant as he could wiſh to have ſeen inſerted; but as it was the firſt that occurred to him; and as it is a Rule with us, to require Solutions along with the Queſtions propoſed: he had not *then* Time to conſider it in any other Light than that which firſt preſented it-

CONSTRUCTION.



Upon A, as a Center, with an Interval equal to the Side of a Square, expreſſing the Magnitude of the given Rectangle, deſcribe an Arch of a Circle, cutting the Periphery of the leſſer Semicircle in F; draw FE perpendicular to AB cutting the Periphery of the greater, in the Point D; thro' which and the Point C, draw the required Line ADC.

DEMONSTRATION.

By ſimilar Triangles, it will be as AB : AC : : AD : AE, therefore $AB \times AE = AC \times AD$; but, by the Property of the Circle, $AB \times AE = AF^2$; = the given Rectangle, by Conſtruction Q. E. I.

We once more return Thanks to our worthy and ingenious Contributors, for the generous Aſſiſtance and Encouragement they give us in this Undertaking; deſiring (as before) that they will pleaſe to ſend us *Things* entirely new (we receiving every Year many very ſevere Cenſures and Accuſations of Piracy among our Contributors, ſhall not chooſe to publiſh much more of that Sort; but rather keep it from the Publick; except when it ſhall become abſolutely neceſſary: it being (we preſume) very poſſible for two Men to think of the ſame Thing, either at the ſame, or at different Times; and therefore may propoſe a Queſtion which they verily believe to be realy new and their own; when perhaps, upon Publication, the ſame may be found in ſome Author which the Propoſer had never the Opportunity to ſee or conſult) and alſo, that their Schemes may be drawn as perfect as poſſible, and of a proper Size; as well as bring out all Equations in Numbers, in order to facilitate the Labour of the Author's, collecting and compiling the Work; and further (as ſeveral Letters come too late in every Year to be poſſibly inſerted, or even mentioned in the Catalogue) hope they will for the future take Care that they be ſent ſoon enough to come to hand before the firſt Day of *May* in every Year, directed for the Authors of the *Gentleman's Diary*, to be left with *Tho. Peat*, Schoolmaſter, in *Nottingham*. (Poſt paid.) *Nottingham*, 16 *June*, 1759.

NEW MATHEMATICAL QUESTIONS propoſed to be anſwered in the next Year's DIARY.

(1) Queſt. 201, by Mr. *Abra. Stone*, Land Surveyor.

The Area of a certain Iſoſceles triangular Field is Eight Acres and an half: Quere the Sides and Angles; when the Area of the inſcribed Circle is equal Half the Field?

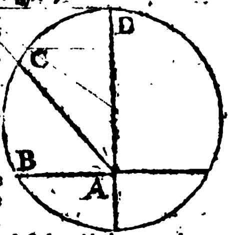
(2) Queſt. 202, by Maſter *William Hutchinſon*, at Mr. *Allen's* School, in *Spalding*.

Through a given Point, betwixt two right Lines making a given Angle; to draw another right Line, ſo that the Sum of the Parts intercepted by it, and the Angular Point, ſhall be a *Minimum*.

(3) Queſt. 203, by Mr. *Tim. Drury*, of *Great-Houghton*, Yorkſhire.

At a certain School where there are 171 Boys, to be taught Latin, Writing, and Accompts ſeparately, at Four Shillings, Six Shillings, and Nine Shillings *per* Quarter; and the Maſter being deſirous to have as much leiſure Time as poſſible, deſires to know how many Boys he muſt teach of each Claſs, ſo as to do the leaſt Work, for the moſt Money, ſuppoſing his Labour proportionable to his Prices?

(4) Queſt. 204, by Mr. *William Kingſton*, of *Bath*.



If from a Point A in the Diameter of a Circle (whoſe Circumference is 69,1152) right Lines be drawn to the Circumference, making the Angle BAC to the Angle CAD as 5 to 4; and the Arch BC=CD, the Angle BAD being a right one: What Diſtance is A from the Center?

(5) Queſt. 205, by Mr. *Tho. Crabtree*.

The greateſt ſlant Height of the Top Slice of an upright Cone is given = 50; and the leaſt = 45; the vertex Angle being 25° 00. It is required to find the Solidity of the greateſt Spheroid that can be cut out of this Slice.

(6) Queſt. 206, by Mr. *Tho. Barker*, of *Weſthall*, *Suffolk*.

Given the Ratio of the Abſciſs, and Ordinate of a Parabolic-Conoid, as 4, to 2,4, and its Convex Superficies = 6980,58996: Quere the Conoids Dimenſions by an Equation not exceeding a Quadratick of the loweſt Order.

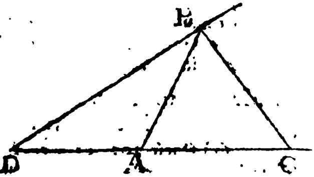
(7) Queſt. 207, by Mr. *John Hudſon*, of *Louth*, *Lincolnſhire*.

Suppoſe an hollow Globe of Copper, whoſe concave Axis = 2 Feet, was tied by a String (whoſe ſpecifick Gravity is equal to that of Water) to a Globe of Cork whoſe Axis = $1\frac{1}{2}$ Feet; and when thrown into common Water, it was obſerved that $\frac{2}{3}$ of the Cork was immerged therein: from hence it is required to find the Thickneſs of the Metal?

(8) Queſt. 208, by Mr. *Thomas Barker*.

Given in a plain Triangle, the Difference of the Segments of the Baſe = 18, and the Sum of the Sides = 150. Quere the Dimenſions when the Area is a *Maximum*.

(9) Queſt. 209, by Mr. *Charles Wildbore*.



Given DC = 100,5, and the Angle D = 25°. It is propoſed to determine the Point B, ſo that BA being equal to DA; the Sum of BA and BC may be a *Minimum*.

(10) Queſt. 210, by *Tabularius*.

Through four given Points, to deſcribe the greateſt Rectangle poſſible.

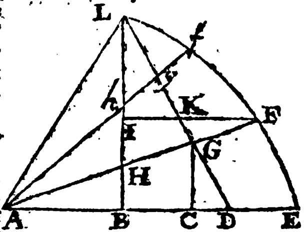
(11) Queſt. 211, by Mr. *William Bevil*.

A *Weſt India* Merchant put his Caſh out at 5 *per Cent. per annum* compound Intereſt as followeth; that is 2 Pounds the firſt Week; the Square of that the ſecond Week; the Cube the third, *&c*, in a geometrical Progreſſion whoſe Ratio is 2: And at the End of thoſe Weeks, he calls in again; the firſt Week one Pound, the ſecond Week two Pounds, the third three, *&c.* in an arithmetical Progreſſion whoſe common Difference is 1. It is required when there will be 9000 Pounds out at Intereſt?

Mr. *Bevil* remarks thus; "I believe I am the firſt Perſon that pro-
"poſed theſe Kind of Queſtions; however, I never ſaw one in Print, be-
"fore that of mine in the *Gentleman's Magazine* for *Feb.* 1752, and not
"yet anſwered. The 10 Queſtion in the L. *Diary* 1756 is mine, it was
"*ſtole* from me by one of my *Scholars*, but not by the Perſon whoſe

(12) Queſt. 212, by Mr. *Zach. Gaſtrell.*

Required the Nature of the Curve LFE, in Terms of the Axis and Ordinate (LI and IF) whoſe Property is ſuch, ALD being an equilateral or iſoſceles Triangle, and BL perpendicular to and biſſecting the Baſe, that HG ſhall be always equal to GF.



(13) Queſt. 213, by Mr. *Tho. Moſs.*

To determine, *geometrically*, in what Latitude North, an Object of 16 Feet long muſt be erected pendicular to the Plane of the Horizon; ſo that on the 5 Day of *November* 1760, the tranſverſe Diameter of the Curve, deſcribed on the Plane of the Horizon, by the Top of the ſaid Object, may be 28 Feet.

(14) Queſt. 214, by *Tabularius.*

Given the Length of an inclined Plane BC=60 Feet, and its Altitude AB=30: And ſuppoſe a heavy Body deſcends, by the Force of its own Gravity, from B to C, in the ſame Time that another Body moves uniformly along the Horizontal Plane from C to A; it is propoſed to determine their neareſt Approach to each other.

(15) Queſt. 215, by Mr. *Charles Wildbore.*

The Altitude of a Parabolic Conoid being given=30, and the Diameter of its Baſe=40: It is propoſed to determine the neareſt Diſtance upon the Surface of the Solid, between two Points in the Circumference of the Baſe that are diametrically oppoſite.

Answers to the Ænigmas in laſt Year's Diary.

1. A Tinder Box.
2. A Bird Cage.
3. A Grave-stone.
4. Fire.
5. A Batt.
6. A Gridiron.
7. A Stocking.
8. A Feather.
9. An Orange.
10. A Magpie.
11. A Ladder.
12. An Oak Tree.

1 Rebus, *Winchelſea.*   2 Rebus, *Durham.*

All the Ænigmas and Rebuſes anſwered by Mr. Tho. Vaughan.

Batt, *Tinderbox*, *Ladder*, *Grave-ſtone*, and *Oak Tree*; 5. 1. 11. 3. 12.
Fire, *Magpie*, and *Stocking*, Durham, Winchelſea: 4. 10. 7. 2 R. 1 R.
Gridiron, a *Feather*, *Orange*, and *Bird Cage*, do 6. 8. 9. 2.
Anſwer the *Ænigmas*, and ſolve *Rebuſes* true.

All the Ænigmas anſwered by Mr. John Atkinſon.

En Procus alter adeſt, et nova nupta Cloe! Qua.

When *Collin*, Pride of *Sylvia*'s Eyes,
Was cruel *Fate*'s untimely Prize:
Oak Ladder rais'd e're *Phœbus* fled, 12. 11.
Fair *Sylvia* mourn'd, her Fav'rite dead!
Whilſt Batts around the Gravestones flew, 5. 3.
And *Cynthia* ſlumber'd o'er the Dew:
As Tinder black her Manflings tore, 1.
Her Stockings dark as Midnight Hour; 7.
No more her Orange Treſſes play'd, 9.
Nor Feather'd Creſt ambitious ſtray'd. 8
The tuneful Woodlands in the Cage, 2
No more than P[illegible] her Grief aſſuage; 10

Where mournful *Biers* rais'd the Dead,
To *Death* her BROILING Fancy fled. 6.
But, Who e'er found fair Females true?
Five Summer Suns ſcarce dry'd the Dew;
To heal her Grief *Philander* came;
And *Sylvia* ſighs no more for *Collin's* FLAME! 4.

All the Ænigmas anſwered by Mr. Iſaac Tarratt.

1. Let *Fops* the ORANGE-CLOCK admire, 9. 7.
PIERIDIES her CAGE: 10. 2.
The *Maid* her TINDERBOX and FIRE, 1. 4.
HIC JACET for the Sage. 3.
2. The UNFLEDG'D BATT, at *Sly Bo-peep* 8. 5.
In ſultry Eve behold;
By Day in ſacred OAK may ſleep, 12.
As *Druids* did of old.
3. Tell Cook to BROIL ſome Cutlets fine; 6.
We'll toaſt Diarian *Peat*;
And Favourites of the *ſacred Nine*;
A LADDER for the Cheat. 11.

All the Ænigmas anſwered by Mr. W. Swift.

As young *Strephon* attempted to give *Cælia* a Kiſs,
The MAGPIE ſhe prattles, Take Care pretty Miſs! 10.
But, as blind as a BATT when She flies in the Day, 5.
So *Miſs* never minded a Word ſhe did ſay:
But *ſnugg* by the FIRE with her *Strephon* She ſits, 4.
With *Stakes* on the GRIDIRON, and *Birds* on the *Spitts*: 6.
But, *Pol* in the CAGE ſoon learnt their *Love Song*, 2.
Your STOCKINGS! dear *Miſs*, She crys all the Day long; 7.
Then *Cælia* She chides her, Fye *Poll*, I ſhall have,
More Lyes told about me, than TOMBS o'er a Grave: 3.
Then, an ORANGE She gave her; and bade her be ſtill, 9.
And mind her own FEATHERS, and ſpeak no more *ill*. 8.
Bright as *Spark* in the TINDERBOX *Strephon* he crys, 1.
From the LADDER and OAK, let us learn to be wiſe: 11, 12.
So ne'er mind, my dear *Cælia*, what of us is ſaid,
The *Parſon's* the *Doctor*, and I'll wed my dear Maid.

All the Ænigmas anſwered by Mr. Jo. Morce; addreſſed to Urban.

Fortunatus et ille Deus, qui novit agreſtes. VIR.

Permit my PEN in ruſtic Terms to tell, 8.
What Happineſs does in the Country dwell.
Free from the BROILS * which do the Town annoy, 6.
I Feaſts of Bliſs perpetually enjoy. [* A *Gridiron*.
Friend, here, nor any Fops, nor empty Beaux
Appear, with powder'd Wigg, nor colour'd HOSE: 7.
Nor here are Balls, nor Play, nor Maſquerade,
Such cloying Joys are empty as the Shade!
Here Fields of Pleaſure open to the Eye,
Which, far the Courts of greateſt Kings outvye
No fierce Ambition here nor Anger reigns,
But bleſt Simplicity adorns theſe Plains:
Sweet is the Reſt which peaceful *Cambria* yields,
While FIRE and Sword lay Waſte *Germania's* Fields! 4.
E'er bluſhing *Sol* riſe from the Eaſtern Main,
When ſerenaded by the warbling Trai

The tuneful *Thruſh*, the *Lark*, and chattering PYE ; 10.
Whoſe Strains confus'dly pleaſant fill the Sky :
I raiſe my LADDER, and with Tranſport view 11.
The ORANGE Groves o'erſpread with ſilver Dew ; 9.
But when th' advancing Rays of *Sol* aſpire,
I Homeward to my CAGE-like Cell retire ; 2.
And *Horace* there, or *Homer's* Works peruſe,
Soft *Ovid's* Amours, or the *Mantuan* Muſe.
But forth again, when BATTS in th' Evening play 5.
When *Phœbe's* Light ſucceeds the ſetting Day,
Where murm'ring Rivers ſteer their winding Way ;
On whoſe delicious Banks the ſtately OAK, 12.
Or ſhady *Lime*, in Order grow, I walk.
Deſpiſe not, *Urban*, this my humble State,
Who envy not the Grandeur of the Great ;
Thrice *Neſtor's* Years, if ſpent in Town 'midſt Strife,
Can't MATCH the Joys of one ſhort Country Life, 1.
A Life of Innocence can even brave,
The Frowns of *Fortune*, and outlive the GRAVE ! 3.

All the Ænigmas anſwered by Mr. William Bamfield.

'Twas at the Time when *Goblins* leave the TOMB, 3. *Graveſtone.*
And ſilent BATTS about the OAKS do roam : 5. 12.
'Twas in that Midnight Hour when Silence reign'd,
That *John* to *Suſan* went, and love-ſick feign'd :
Gentle Compaſſion warm'd her glowing Breaſt,
Yet with Admittance he could not be bleſt ;
For this chaſte Fair (to keep her Virtue pure)
Was like a MAGPYE, CAG'D up quite ſecure : 10. 2.
Under the Window, long he prais'd her Charms ;
And fondly wiſh'd t' enfold her in his Arms !
At Length, the yielding Maid, with Love grown kind.
Gave free Conſent ; could he a Method find :
Elate with this ! He ſoon found out the Art
With *Rope* and LADDER : Thus he play'd his Part! 11.
There, Then ! no doubt ; Nature did dictate well :
And Joys were found, which they themſelves may tell !
Then, ere bright *Phœbus* from his Bed 'aroſe,
They both reſolv'd to join in *Hymen's* Nooſe ;
Suſan, in bridal Dreſs, put on her fineſt HOSE. 7.
The TINDER's friendly Aid they now require, 1.
Which ſoon communicated willing FIRE ; 4.
Some little Dainty of the FEATHER'D Race, 8.
On uſeful GRIDIRON dreſs'd in little Space : 6.
All this b'ing done ; each fill'd with mutual Bliſs,
They ſeal'd the Bargain with endearing Kiſs ;
Till, with glad Steps, they paſs'd the ORANGE Groves, 9.
To let the *Prieſt* confirm their happy Loves.

Meſſrs. *Barker*, *Beer*, *Goffe*, *Harris*, *Hartley*, *Horsfall*, *Hiprocates*, *Marſh*, *Rowe*, *Sadler*, *Weſtcott*, *Wildbore*, and others, ſent Solutions to the *Ænigmas* in Verſe, which Room will not permit us to publiſh.

To the Authors. *Gents.*

Tho' *Rebuſes*, *Ænigmas*, &c. are by no means the Favourites of modern Delicacy, common Juſtice, I think, ought to be allowed them.

If they fix the Attention, beget an Habit of thinking, exerciſe th known by its Fruit) to pronounce them ſomething better than elaborate Trifles ; and hereby ſend you my ſecond Eſſay of this Kind.

Yours, *&c.* *W. Bickerſtaffe.*

New ÆNIGMAS to be anſwered next Year.

(1) Ænigma 147, by Mr. *W. Bickerſtaffe.*

Of mental birth, from Heav'n I came,
A Prince of antient worth and Fame ;
My god-like Virtues I impart,
My Empire ſways the human Heart :
And yet, in modern Times, 'tis ſaid,
My Pow'rs are cold, inert or dead ;
That where my Talents I diſplay
Ill Motives oft my Cauſe betray.
In various Modes and Hues I'm ſet,
In thought or outward Act compleat.
Tho' cheriſh'd by the good and great,
A *Spittle's* not below my State ;
I build, I bake, I cloathe, I plant,
For preſent and for future Want :
Yet oft my Gifts how ill requited !
Oppos'd, miſrepreſented, ſlighted.

(2) Ænigma 148, by Mr. *John Thorpe.*

Alike in *Size*, in *Shape*, in *Faſhion* ;
Subject to neither *Pride* nor *Paſſion* ;
Yet wear a *Furr*, with modiſh Grace,
But never ſeen in *Silks* or *Lace* ;
Our Buſineſs is to pleaſe the Fair
And *them* we make our chiefeſt Care ;
Wait *their* Commands, and give Attendance,
Tho' oft on *us* is their Dependance :
To *dirty* Buſineſs *chiefly* put, [Foot,
And trudge from Town to Town on
Always to pleaſe uſe our Endeavour,
Which, one would think ſhou'd merit Favour ;
But, hard's the Caſe, for Service paſt
Abus'd, and trampl'd on at laſt !
Oppreſs'd in Age as well as Youth,
Yet, in return, to ſpeak the Truth ;
The fair Ingrate we ſometimes *nick*
By ſerving her ſome ſancy Trick.
" As blooming *Jenny* th' other Day
From milking Homeward took her Way,
Tripping along with merry Cheer,
I, and my Brother being near,
He chanc'd to give a ſudden Start,
Frighted poor *Jenny* to the Heart !
Down fell the *Pail!* *Jane* got a Tumble [ble ;
And, ſurely, She had cauſe to grum-
Tho' *great* the Fright, and great the
I, no Aſſiſtance lent at all." [Fall ;

(3) Ænigma 149, by Mr. *Zach. Gaſkell.*

Of worthleſs Joys abſtruſe, for grand Parade,
Let Others introduce in Maſquerade :
A Worth, in Theme tho' plain, we here prefer,
As tough and hardy as a bold *Huſſar.*
If *Uſe*, the Touchſtone of intrinſick Worth
Reſpect Demands ; tho' humble be the Birth :
Then ſurely I may juſtly claim a Share
Of Man,——the tender Object of my Care ;
A Care you'll ſay all other Cares exceed,
When you are told, I am a *Friend in Need !*
Yet this my Character ; tho' ſuch my Uſe,
If not confin'd to Duty, often *looſe.*
When ſultry *Phœbus* climbs the cloudleſs Sky,
And darts on Man and Beaſt his burning Eye ;
Then am I ſeldom ſeen, then ſeldom roam,
Like *Frogs* and *Snails*, I then abide at Home :
But when the *Welkin* frowns, and *Winds* ariſe,
Clouds cover Clouds and blacken all the Skies,
Inſenſible of Ill, or Cold, or Pain,
I ruſh abroad, and face the threat'ning Rain.
My Bulk (take next) is large, ſo ſtyled *great*,
Now in *dilated*, then *contracted* State ;
And when expanded, ſuch my Guard 'gainſt Harms
I claſp my other Breth'ren in my A

The careful *clucking Hen* ſo ſhields from Wrong,
From ravenous *Kites*, or chilling Blaſts her *Young*.
By the ſame Hands our graceful Form we gain
(Thoſe Hands that many *Canibals* have ſlain)
And Wounds, deem'd never to be heal'd again.
The ſever'd Parts condemn'd in Shades to dwell
By the ſame Hands *inſatiate* thrown to *Hell*:
Hold! Stop! enough is ſaid my Name to tell.

(4) Ænigma 150, by Mr. *Jo. Morce*.

Artiſts, if e'er Compaſſion touch'd your Breaſt
With ſoft Concern, for Innocence diſtreſs'd;
Me you will find (tho' Pity's no Relief)
A ſuff'ring Object that demands your Grief!
Driv'n from the Earth where Mortals ſafe reſide
In Airy Realms I ever muſt abide;
Naked, expos'd to *Sol's* hot ſcorching Rays
I paſs the tedious Length of Summer's Days:
Nor dire Extremes of Heat I only know
But th' intenſe Cold of Winter's Froſt and Snow.
When nodding Foreſts with the Tempeſts bend,
And raging Storms the waving Poplars rend;
When angry *Jove's* tremendous Thunders fly,
And rapid Light'nings tear the vaulted Sky!
No Shelter for my guiltleſs Head I find,
(*Prometheus* like, on *Caucaſus* detain'd)
The boiſt'rous Servants of *Æolus* Train
Do all conſpire to aggravate my Pain!
When rattl'ing *Boreas* from the North doth riſe,
When piercing *Eurus* thro' the Country flies,
Or gloomy *Notus* with his wat'ry Train,
Aſcends with Neptune's Forces from the Main;
On *Me* they war; with *me* they *all* engage;
Me they aſſault, on *me* exhauſt their Rage!
No Coward yet nor Miſcreant am I,
I brave their Fury, and their Force defy:
With open Front, I face th' advancing Foe,
The Field I quit not; nor my Ground forego.

(5) Ænigma 151, by Mr. *Thomas Sadler*.

Quite back to our *firſt* Parents you may trace
My Riſe and Pedigree in human Race:
Tho' oft a *Fiend* to *Men*——What can be worſe?
Whilſt *hers* on Earth, I am his heavieſt Curſe!
Some jolly *Sons* of *Bacchus* know that I,
Their greateſt Foe am;——their worſt Enemy:
The *Bully*, or the bold Pot-valiant *Rake*
I make to run, to tremble, and to quake.
An ancient *Sage*, as Hiſtory doth tell
To Anger mov'd,——ſaid, ſure I came from Hell!
Oft, with vocif'rous Fury, Storm and Rage;
It's paſt Man's Art, my Paſſion to aſſuage:
I (or my Emblem) oft appear in view
At *Drury-Lane*, and *Convent-Garden* too:
In *Town* and *Country*, I for ever dwell
At *Norbury* too!——What wou'd you have me tell?
As *Juvenal* ſays, the lab'ring Moon can eaſe,

Scolding Wife

Shou'd I within the Peaſant's Cottage dwell,
No Joys ſtay there ;——until my laſt Farewell :
But, when my *Exit's* made ; then *Pleaſures* found,
And *Mirth* and *Jollity* go briſkly round :
The *happy Pair*, I ſeldom come a-near ;
Where *Virtue* reigns, I never ſcarce appear.

(6) Ænigma 152, by Mr. *R. Roulſon.*

Say what ye will, ye Men of Merit,
I once *Hibernia* did inherit,
A Piece of Land, tho' not ſo great
As *Teagues* have boaſted on of late
To be their *Anceſtors* Eſtate.
A little Spot contented me,
Till kinder Fortune ſet me free ;
Then courage took, to *England* came,
There cut and ſlaſh'd, I purchas'd
Fame :
Since, at a Feaſt, or dainty Meſs
I, and my Breed are welcome Gueſts ;
I feed the Poor, I pleaſe the Great,
At Table am their conſtant Mate :
I' th' *Field* I make a gallant Shew
Turn'd up with green, as fine as beau,
And top-knot wear as white as ſnow.
'Tis true ; I cannot bear the cold,
A Fire beſt ſuits me when I'm old ;
When warm, I am the moſt admir'd,
My Name is all that's now requir'd.

Potatoes

(7) Ænigma 153, by Mr. *Thomas Harris.*

I hope to your fam'd DIARY no Diſgrace,
Tho' in it yet, I ne'er cou'd find a Place :
In Days of yore, I have much honour'd been,
For my Humanity, and Heavenly Mien.
I once ſaluted *Car'as* rural Strain,
Yet he my touring Voyage ne'er could gain ;
Progreſſive Ages ſearch'd my Paths to find,
And watch'd elaborate,——but ſtill was blind ;
Till *Albion's* Son, with Vigilance aroſe,
Who trac'd my Paths, and then did me expoſe.
None can my potent Energy withſtand
When boundleſs Oceans are at my Command :
My beaut'ous Robes are lent me by a Brother,
And I as freely lend them to another ;
Who, in return for ſuch Civility,
Full fifteen Times does lib'rally repay.
Ancient and modern Bards *vary* my Name :
Which now to tell may your Attention claim.

(8) Ænigma 154, by Mr. *Charles Wildbore.*

The fear of youth ; the dread of age,
Now *bugbear* like I mount the ſtage ;
With bleared Eyes, thin meagre jaws ;
Long, horny, dirt-encloſing claws :
With hacking teeth, and feeble knees
Hands tremb'ling like the *Aſpin trees* :
Each ſhaking limb ſalute it's brother
Like *knick-knacks* beating one another :
Old, hungry, comfortleſs and poor,
Far from each hoſpitable Door :
Decrepid, naked, full of Woes ;
Mid Froſt-encruſted laſting Snows.
I make the Soldier draw his Sword ;
For me, the Miſer heaps his hoard ;
Yet as his ſordid Bags encreaſe,
'Tis I that keep his mind from peace!
'Tis I to labour wake the Poor,
nd teaze the rich in circ'ling
Since I firſt taught to plow and ſow,
To me, men ſmiling Plenty owe :
They owe likewiſe their Children, Wives
(The pain or pleaſure of their lives)
Houſes, and lands ; yea cloaths, and trade ;
And all whereby they're happy made,
Yet, from me *all* would gladly fly
When they're moſt certain I draw nigh :
For, I proclaim the rich man poor ;
Make lovers ſigh and lions roar :
'Tis I inſtruct the lab'ring *Bee*,
And teach the *Aunt* her Induſtry :
And tho' men in all ſtations ſhow me,
[me.

(9) Ænigma, 155, by Mr. *Thomas Vaughan.*

Ænigmatiſts, give ear to what I ſay,
Adam and I, had Being the ſame Day:
For many Ages I was ſcarcely known,
Little regarded, and eſteem'd by none.
But, in Proceſs of Time was made a Knight,
Became the People's Darling and Delight.
No Duke, no Earl, no Lord, nor Knight you'll ſee,
So much reſpected and belov'd as Me:
T' enhance my Worth.——I was a Favourite
To *England's* Queen Elizabeth the Great.
In Me is found a Sov'reign Pow'r to ſave
Numbers of Creatures from the threat'ning Grave;
But take this Hint; thoſe I ſerve beſt of all
Will ſeldom reſt until they ſee me fall!

(10) Ænigma 156, by Mr. *John Atkinſon.*

From infant Years, to hoary Age you'll find,
My tempting Train deſir'd by all Mankind:
Without my Aid, no prating *Lawyers* charm,
Nor can the *Parſon*, or the *Patriot* warm.
When *Grecian* Heroes ſtain'd the *Trojan* Stream;
I, in ſweet Numbers ſung the *Victor's* Fame:
My Charms have bloſſom'd in *Bucolic* Strain,
And found Acceptance with your Fav'rite *Ben.*
I viſit *Will's*, and *Garrick's* Houſe applaud,
Yet rarely grace a paultry *Birth-Day Ode.*
Some honour me, by me their Fortunes raiſe;
Some call me Spendthrift, and my Uſe diſpraiſe;
Some ſimple Youths abuſe my Favours ſhewn,
Turn *Sots* and *vicious* by my gen'rous Boon.
You ſcratch your Pates, or *beat* your ſenſeleſs Brain
To make *Ænigmas*; or their Parts explain.

(11) Ænigma 157, by Mr. *William Swift.*

I think I did never in Diary appear,
Your Attention pray give, if my Name you'd declare,
Know, Legs I have got, but the Truth I muſt tell,
Yet, I ſeldom do walk, that is known very well:
As great a *Back-biter* as any's in *France*,
Notwithſtanding all that, with the *Ladies* I dance;
And I often preſume to ſteal a ſweet Kiſs
Which may ſtartle her Lover, as well as dear Miſs:
Sometimes to the *Fair* I give Patches or Paint,
Or to dear Maſter *Fribble*; and oft on the Saint:
But when e'er I am caught, I may well ſob and ſigh;
Am ſtraightly nail'd down, and immediately die.

(12) Ænigma 158, by Mr. *T. Beer.*

In *Ænigmatic* Verſe my Muſe indites,
Attention begs, and thus the following writes:
In Labour I, ſuch is my State, alas!
While Mortals ſleep, the tedious Hours do paſs.
Support the Rich; to th' Poor Refreſhment give;
Nouriſh th' infirm, and Travellers relieve.
I unreſiſting deign to undergo,
Moſt dire Diſeaſes, and malignant Woe:
Oh Lot ſevere! depreſs'd with poignant Pain
And foil'ſt Malignity, I ne'er complain.

A Friend I am to Sailor, Soldier, Chief:
To th' weary *Hind*, and *Peaſant* give Relief:
I drooping Spirits raiſe; Alacrity create;
Man, when poſſeſs'd of me, lays by Debate.
With Ladies I, in private may be ſeen,
To their Embraces oft receiv'd I've been:
Ye learned Tribe, from hence my Name explore;
The Miſts diſpel, I aſk from you no more.

(13) Ænigma 159, by Mr. *John Clark*.

I from an ancient King my Being claim,
Yet was before him, and am ſtill the ſame:
Tho' oft with Wretches mean, I take my Station
Am, for my Honour valu'd thro' the Nation:
I to the Ladies am a well known Friend,
And where they go, I moſtly do attend;
But, yet alas! if I ſhould chance to fall
So ſure I bring Confuſion on them all!
Once I was loſt,——ſuppoſe on *Engliſh* Ground,
'Till *Fortune* brought my *Sire* where I was found;
Old *Antiquaries* ſay, if they tell right
I was the Signal to beg'n the Fight.

A Quere by Mr. *John Atkinſon*.

Si fugio, ſequitur, ſed me fugit uſque ſequentem;
Res mira et vera eſt, dic mihi, quæſo, quid eſt.

An *Alphabetical* Catalogue of Contributors to this *Diary*: Wherein the Figures 1, 2, 3, &c. ſhew the Queſtions, and the Numericals, i, ii, iii, &c. the Ænigmas each Contributor anſwered, &c.

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The LADIES' *Diary*:
OR,
Woman's ALMANACK,
For the YEAR of our LORD 1760.
Being the BISSEXTILE, or LEAP-YEAR.
Containing New Improvements in ARTS and SCIENCES,
And many Entertaining PARTICULARS;
Adapted for the *Uſe* and *Diverſion* of the
FAIR-SEX.

Being the Fifty-Seventh ALMANACK Publiſh'd of this Kind.

YE Happy FAIR, whom Sacred Tranſports fire,
Accept, propitious, what Your-Selves inſpire:
For YOU the MUSE her kindeſt Influ'nce lends,
And SCIENCE wide its ample Bounds extends;
Alike your FORM and WIT reſiſtleſs charm;
With LOVE and VERTUE ev'ry Boſom warm.

Printed by *A. Wilde*, for the Company of STATIONERS, 1760.

[Price, Stitch'd, Nine-Pence.]

A Chronology of Remarkable Events.

Y. of Chriſt		Years ſince
1600	KING *Charles* I. Born —	160
1603	Q. *Elizabeth* Died, and King *James* Succeeded —	157
1603	A great Plague in *London* —	157
1605	Popiſh Gun-powder Plot —	155
1625	K. *James* died, & K. *Ch.* ſuc.	135
1641	Bloody *Iriſh* Maſſacre —	119
1642	*Edgehill* Fight — —	118
1643	*Newbury* Fight — —	117
1644	*Marſton-Moor* Fight —	116
1645	Battle of *Naſeby* — —	115
1649	King *Charles* I. Beheaded	111
1651	Fight of *Worceſter* — —	109
1658	*Oliver Cromwel* died — —	102
1660	King *Charles* II. Reſtored —	100
1665	Laſt great Plague in *London*, whereof died 68586 Perſons	95
1666	Great Fire in *London* — —	94
1685	King *Charles* II. Died, and King *James* II. Succeeded	75
1685	Duke of *Monmouth* Beheaded	75
1688	Prince of *Orange* Landed —	72
1688	King *James* II. Abdicated —	72
1689	K. *Wil.* and Q. *Mary* Crown'd	71
1702	K. *Wil.* died, and Q. *Ann* Suc.	58
1702	War againſt *France* declared	58
1703	Terrible Wind, *Nov.* 26. —	57
1704	*Gibraltar* taken — —	56
1704	*French* beat at *Hochſtet* —	56
1706	*French* beat at *Ramellies* —	54
1707	*England* and *Scotland* United	53
1708	*French* beat at *Oudenard* —	52
1709	*French* beat at *Blarequies* —	51
1713	Peace with *France* Proclaim'd	47
1714	Queen *Ann* Died, and King *George* I. Succeeded —	46
1716	Rebellion in the *North* — —	44
1716	A very great Froſt — —	44
1727	King *George* I. Died, and King *George* II. Succeeded	33
1739	The laſt Great Froſt — —	21
1739	War againſt *Spain* declared —	21
1743	A Great Comet appeared —	17
1744	War againſt *France* declared	16
1745	Rebellion in *Scotland* —	15
1748	A General Peace — —	12
1752	The New Stile firſt uſed in *England* — — —	8

Birth-Days of the Royal-Family of *Great-Britain.* [New Stile.]

KING GEORGE II. Born, *November* 10 — —	1683
Prince of *Wales*, *June* 4, —	1738
Ps. *Amelia*, *June* 10, — —	1711
Ps. Dow. of *Wales*, *Nov.* 30,	1719
Duke of *Cumberland*, *April* 26,	1721
Mary, Ps. of *Heſſe*, *March* 5,	1722
Ps. *Auguſta* Born, *Aug.* 11, —	1737
P. *Edward*, *March* 25, — —	1739
P. *William Henry*, *Nov.* 25, —	1743
P. *Henry Frederick*, *Nov.* 7, —	1745
Ps. *Louiſa Ann*, *March* 19, —	1749
P. *Fred: William*, *May* 24, —	1750
Ps. *Caroline Matilda*, *July* 22,	1751

Years of the Birth of the Principal Sovereign PRINCES in *EUROPE.*

FRancis, Emp. of *Germ.* Born,	1708
Maria Thereſa, Emp. Queen,	1717
Elizabeth, Empreſs of *Ruſſia*, —	1709
Lewis XV. K. of *France*, —	1710
Don Carlos, K. of *Spain*, —	1716
Adolphus Fredk K. of *Sweden*,	1710
Frederick, K. of *Denmark*, —	1723
Joſeph. King of *Portugal*, Born,	171
Cha. Frederick, K. of *Pruſſia*, —	171
Frederick Auguſtus, K. of *Poland*,	169
Charles Emanuel, K. of *Sardinia*,	170
Clement XIII. Pope, — —	169
Muſtapha, Grand Seignior, —	17

1760. January hath XXXI Days.

Full Moon, 2d Day, 51 m. paſt 4 aftern.
Laſt Quarter, 10th, 55 m. paſt 5 morn.
New Moon, 18th, 31 m. paſt 6 morn.
Firſt Quarter, 25th, 10 m. paſt 7 morn.

Sun enters ♒ 19th. 23 h. 40 m. Apparent Time.

1	T	Circumciſion: or, New-	8	5	3	55	23	4	6	39	13
2	W	[Year's-Day		5		55	22	58	☽ riſes		14
3	T			4		56		52	4	52	15
4	F			3		57		46	6	[illegible]	16
5	S	Old CHRIST-MASS-DAY		2		58		39	7	16	17
6	F	Epiphany: Twelfth-Day		1		59		32	8	31	18
7	M			0	4	0		25	9	43	19
8	T	*Lucian*, Pr. and Martyr	7	59		1		17	10	51	20
9	W			58		2		9	11	59	21
10	T			57		3		1	Morn.		22
11	F			56		4	21	52	1	5	23
12	S			55		5		42	2	13	24
13	F	1 Sun. aft. Epiph. *Hilary*		54		6		32	3	20	25
14	M	Oxford and Cam. Terms		53		7		21	4	28	26
15	T	[Begin		51		9		10	5	34	27
16	W			50		10	20	59	6	38	28
17	T	Old Twelfth-Day		49		11		48	7	34	29
18	F	*Priſca*, Martyr		48		12		37	☽ ſets		30
19	S			46		14		24	5	32	1
20	F	2 S. aft. Ep. *Fabian*. In 8		45		15		11	6	48	2
21	M	*Agnes*. [days of S. Hil. 1 Ret.		44		16	19	58	8	6	3
22	T	*Vincent*, Martyr.		42		18		45	9	27	4
23	W	Hilary Term Begins		41		19		31	10	47	5
24	T			40		20		16	Morn.		6
25	F	Converſion of St. PAUL		38		22		1	0	9	7
26	S			36		24	18	46	1	28	8
27	F	3 S. aft. Ep. From day of		35		25		31	2	50	9
28	M	[St. Hil. in 15 days, 2 Ret.		33		27		16	4	10	10
29	T			31		29		1	5	25	11
30	W	K. *CHARLES* I. Martyr'd		30		30	17	41	6	27	12
31	T			28		32		2[illegible]	7	19	13

Days	L. of D.		Day Inc.		D.breaks		Sun Eaſt.		Tw.ends		C.bef. S.		7Stars So.	
1	7	50	0	6	6	0	4	41	6	0	4 b.	2	8 A	45
6		57		13	5	58		43		2	6	19		23
11	8	7		23		54		46		6	8	25		1
16		19		35		49		49		11	10	17	7	40
21		32		48		44		53		16	11	50		19
26		47	1	3		38		57		22	13	6	6	[illegible]

1760. February hath XXIX Days.

Full Moon, 1ſt, 23 m. paſt 6 morn. Laſt Quarter, 9th, 19 m. paſt 3 morn. New Moon, 16th, 41 m. paſt 6 aftern. Firſt Quarter, 23d, 16 m. paſt 3 aftern.	*Sun* enters ♓ 18th. 14 h. 32 m. Apparent Time.

	W. D.	Sundays, Holydays, &c.	Sun riſes	Sun ſets	Sun's Decl.	☽ riſes & ſets	☽'s Age
1	F		7 27	4 33	17 11	☽ riſes	14
2	S	Purif. or, Candle-Maſs-Day	25	35	16 54	5 58	15
3	F	Septuag. Sund. On mor.	23	37	36	7 11	16
4	M	[of Purif. 3 Ret.	21	39	18	8 24	17
5	T	*Agatha*, Martyr	20	40	0	9 34	18
6	W		18	42	15 41	10 40	19
7	T		16	44	23	11 50	20
8	F		14	45	4	Morn.	21
9	S		12	48	14 45	1 0	22
10	F	Sexag. Sunday. In 8 days	10	50	25	2 8	23
11	M	[of Purif. 4 Ret.	8	52	5	3 17	24
12	T	TERM Ends	6	54	13 46	4 22	25
13	W	Old Candle-Maſs-Day	4	56	26	5 19	26
14	T	*Valentine*, Bp. and Martyr	2	58	6	6 9	27
15	F		0	5 0	12 46	6 50	28
16	S		6 59	1	25	☽ ſets	29
17	F	Shrove-Sunday. Quinquag.	58	2	4	5 41	1
18	M		56	4	11 43	7 5	2
19	T	Shrove-Tueſday	54	6	21	8 30	3
20	W	Aſh-Wedneſday	52	8	0	9 53	4
21	T		50	10	10 39	11 16	5
22	F		48	12	17	Morn.	6
23	S		46	14	9 55	0 38	7
24	F	Quadrag. 1 Sund. in Lent	44	16	33	2 0	8
25	M	[St. MATTHIAS	42	18	11	3 13	9
26	T		40	20	8 48	4 20	10
27	W	Ember Week.	38	22	26	5 15	11
28	T		36	24	3	5 56	12
29	F		34	26	7 40	6 30	13

Days	L. of D.	Day incr	D. breaks	Sun Eaſt.	Tw. ends	Clo bef. S.	7Stars So.
1	9 6	1 22	5 32	5 4	6 28	14 b. 8	6 A 34
6	25	40	24	9	36	38	13
11	43	58	16	15	44	46	5 53
16	10 1	2 17	7	20	53	37	34
21	20	36	4 58	26	7 2	8	15
26	40	56	49	32	11	13 24	4 56

1760. March hath XXXI Days.

Full Moon, 1ſt, 16 m. paſt 9 night
Laſt Quarter, 9th, 54 m. paſt 11 night
New Moon, 17th, 2 m. paſt 8 morn.
Firſt Quarter, 23d, 47 m. paſt 11 night
Full Moon, 31ſt, 6 m. paſt 1 aftern.

Sun enters ♈
19th. 15 h. 11 m.
Apparent Time.

1	S	*David*, A. B. of *Minevia*	6 32	5 28	7 17	☽ riſes	14
2	E	2 Sunday in Lent	30	30	6 54	6 8	15
3	M		28	32	31	7 19	16
4	T		26	34	8	8 30	17
5	W	Princeſs of HESSE Born	24	36	5 45	9 38	18
6	T		22	38	22	10 47	19
7	F	*Perpetua*	20	40	4 58	11 54	20
8	S		18	42	36	Morn.	21
9	E	3 Sunday in Lent	16	44	12	1 2	22
10	M		14	46	3 49	2 7	23
11	T		12	48	25	3 10	24
12	W	*Gregory*	10	50	0	4 4	25
13	T		8	52	2 38	4 49	26
14	F		6	54	14	5 26	27
15	S		4	56	1 49	5 54	28
16	E	4 S. in Lent. Midlent-Sun.	2	58	27	6 20	29
17	M	St. *Patrick*	0	6 0	3	☽ ſets	30
18	T	*Edward*	5 58	2	0 38	7 35	1
19	W	Princeſs Louiſa Ann Born	56	4	16	9 4	2
20	T	Equal Day and Night	54	6	N. 8	10 30	3
21	F	*Benedict*	52	8	33	11 53	4
22	S		50	10	55	Morn.	5
23	E	5 Sunday in Lent	48	12	1 20	1 16	6
24	M		46	14	42	2 25	7
25	T	LADY-DAY. P. Edw. Bo.	44	16	2 6	3 23	8
26	W		42	18	31	4 6	9
27	T		41	19	54	4 37	10
28	F	Cambridge Term Ends	39	21	3 16	5 3	11
29	S	Oxford Term Ends	37	23	41	5 24	12
30	E	Palm-Sunday	35	25	4 4	5 44	13
31	M		33	27	27	☽ riſes	14

Days	L. of D.	Day incr.	D. breaks	Sun Eaſt.	Tw. ends	Clo. bef. S.	7Stars So
1	10 57	3 13	4 42	5 36	7 18	12 b. 39	4 A 41
6	11 17	33	31	42	29	11 31	23
11	37	53	20	48	40	10 12	
16	57	4 13	10	55	50	45	3 4
21	12 16	32	0	6 1	8 0	15	2
26	35	51	3 48	7	12	42	1

1760. April hath XXX Days.

Laſt Quarter, 8th, 34 m. paſt 5 aftern.
New Moon, 15th, 10 m. paſt 5 aftern.
Firſt Quarter, 22d, 9 m. paſt 7 morn.
Full Moon, 30th, 26 m. paſt 5 morn.

Sun enters ♉
19th. 4 h. 16 m.
Apparent Time.

1	T		5 31	6 29	4 50	7 33	15
2	W	[Bp. of *Chicheſter*	29	31	5 13	8 41	16
3	T	Maundy-Thurſday. *Rich.*	27	33	36	9 49	17
4	F	GOOD-FRIDAY	25	35	59	10 58	18
5	S	Old Lady-Day	23	37	6 21	Morn.	19
6	E	EASTER-DAY	21	39	44	0 7	20
7	M	Eaſter-Monday	19	41	7 6	1 10	21
8	T	Eaſter-Tueſday	17	43	29	2 7	22
9	W		15	45	51	2 52	23
10	T		13	47	8 13	3 30	24
11	F		11	49	36	4 1	25
12	S		10	50	58	4 28	26
13	E	1 Sun. aft. Eaſt. Low-Sund.	8	52	9 20	4 51	27
14	M		6	54	41	5 11	28
15	T		4	56	10 2	☽ ſets	29
16	W	**Oxford and Cambridge**	2	58	23	8 11	1
17	T	[Terms Begin	0	7 0	44	9 38	2
18	F		4 58	2	11 5	11 3	3
19	S	*Alphage*	56	4	25	Morn.	4
20	E	2 Sund. aft. Eaſt. From	55	5	46	0 20	5
21	M	[Eaſt. 15 Days, 1 Ret.	53	7	12 6	1 25	6
22	T		51	9	27	2 16	7
23	W	St. George, Mart. Eaſter	50	10	47	2 53	8
24	T	[TERM Begins	48	12	13 6	3 20	9
25	F	St. MARK, Evangeliſt	46	14	25	3 40	10
26	S	Duke of Cumberland Born	44	16	45	3 58	11
27	E	3 Sunday after Eaſter	42	18	14 4	4 13	12
28	M	From the Day of Eaſter	41	19	23	4 27	13
29	T	[in 3 Weeks, 2 Ret.	39	21	42	4 42	14
30	W		37	23	15 0	☽ riſes	15

Days	L. of D.	Day Inc.	D. breaks	Sun Eaſt	Tw. ends	C bef. S.	7 Stars So.
1	13 0	5 16	3 31	6 15	8 31	3 b. 50	2 A 48
6	20	36	19	21	43	2 20	30
11	39	55	4	27	58	0 54	11
16	58	6 13	2 52	33	9 11	0 a. 22	1 53
21	14 17	32	38	39	25	1 37	34
26	34	50	23	44	40	2 27	15

1760. May hath XXXI Days.

Laſt Quarter, 8th, 20 m. paſt 7 morn. New Moon, 15th, 4 m. paſt 1 morn. Firſt Quarter, 21ſt, 55 m. paſt 7 aftern. Full Moon, 29th, 25 m. paſt 9 night	*Sun* enters ♊ 20th. 5 h. 13 m. Apparent Time,

1	T	St. Philip *and* James	4	35	7	25	15	18	8	55	16
2	F			33		27		36	10	3	17
3	S	Invent. of ✝		32		28		54	11	8	18
4	E	4 Sunday after Eaſter		31		29	16	11	Morn.		19
5	M	From the Day of Eaſter in		29		31		28	0	7	20
6	T	1 Month, 3 Ret.		28		32		44	0	58	21
7	W			26		34	17	1	1	37	22
8	T			24		36		17	2	10	23
9	F			23		37		33	2	37	24
10	S			21		39		49	2	59	25
11	E	5 S. aft. Eaſt; Rogat. Sund.		20		40	18	4	3	17	26
12	M	Old May-Day. From Eaſt.		18		42		19	3	35	27
13	T	in 5 Weeks, 4 Ret.		16		44		33	3	53	28
14	W			15		45		48	4	17	29
15	T	CHRIST's Aſc. Holy Th.		13		47	19	2	☽ ſets		30
16	F	On mor. of Aſcen. 5 Ret.		12		48		16	10	3	1
17	S			10		50		30	11	18	2
18	E	6 Sunday after Eaſter		9		51		43	Morn.		3
19	M	TERM Ends. *Dunſtan*		7		53		56	0	18	4
20	T			6		54	20	8	1	3	5
21	W			4		56		20	1	36	6
22	T	Oxford Term Ends		3		57		32	1	58	7
23	F			2		58		43	2	14	8
24	S	Pr. Frederick William Bo.		0	8	0		54	2	27	9
25	E	WHIT-SUNDAY	3	59		1	21	5	2	40	10
26	M	Whit-Monday		58		2		15	2	52	11
27	T	Whit-Tueſday. *Ven. Bede*		57		3		24	3	6	12
28	W	Ember Week		56		4		34	3	21	13
29	T	K. CHARLES II. Reſt.		55		5		44	☽ riſes		14
30	F			54		6		53	9	4	15
31	S			52		8	22	2	10	3	16

Days	L. of D.	Day Inc.	D. breaks	Sun Eaſt	Tw. ends	C. aft. S.	7 Stars So.
1	14 52	7 8	2 5	6 50	9 59	3 a. 12	0 A 56
6	15 7	23	1 51	55	10 13	43	37
11	23	39	29	7 0	35	59	18
16	38	54	6	4	59	4 2	11 M 58
21	53	8 9	0 30	8	11 36	3 49	39
26	16 5	21	No Night	12	No Night	24	20

1760 June hath XXX Days.

Laſt Quarter, 6th, 16 m. paſt 5 aftern. New Moon, 13th, 17 m. paſt 8 morn. Firſt Quarter, 20th, 22 m. paſt 8 morn. Full Moon, 28th, 18 m. paſt noon.	*Sun* enters ♋ 20th 14 h. 14 m. Apparent Time.

1	E	Trin. Sund. *N. com.* P.&M.	3 51	8 9	22 10	10	57	17
2	M	On mor. of Holy Trin. 1 Ret.	50	10	18	11	43	18
3	T		49	11	25	Morn.		19
4	W	Prince of WALES Born.	Oxf.	Ter.	Begins	0	17	20
5	T	*Corpus Chriſti. Boniface*	48	12	38	0	46	21
6	F	Trinity TERM Begins	47	13	44	1	7	22
7	S		47	13	50	1	25	23
8	E	1 Sunday after Trinity	46	14	56	1	41	24
9	M		46	14	23 2	1	56	25
10	T	Princeſs Amelia Born	45	15	7	2	15	26
11	W	St. BARNABAS	45	15	11	2	35	27
12	T		44	16	14	3	2	28
13	F		44	16	17	☽	ſets	29
14	S		44	16	20	9	53	1
15	E	2 Sunday after Trinity	43	17	23	10	42	2
16	M		43	17	25	11	20	3
17	T	St. *Alban*	43	17	27	11	45	4
18	W		43	17	28	Morn.		5
19	T		Longeſt Day at *London* is 16 h.	35 m. 6 ſec. allowing 9 m. 54 ſ.	on Account of Refraction. 29	0	8	6
20	F	*Edward*			29	0	26	7
21	S	Longeſt Day			29	0	40	8
22	E	3 Sund. after Trin. King			28	0	55	9
23	M	[GEORGE II. Inaug.			27	1	9	10
24	T	St. John Bap. Midſum. Day	43	17	26	1	26	11
25	W	TERM Ends	44	16	24	1	44	12
26	T	King GEORGE II. Procl.	44	16	22	2	8	13
27	F		44	16	20	2	42	14
28	S		45	15	18	☽	riſes	15
29	E	4 S. aft. Tr. S. Peter & Paul	45	15	15	9	30	16
30	M		46	14	11	10	7	17

Days	L. of D.		Day incr.			Sun Eaſt			Clo. aft. S.			7 Stars So.	
1	16	19	8	35	No real Night but conſt. Daylight or Twil.	7	16	No real Night but conſt. Daylight or Twil.	2	a.	39	10 M	54
6		27		43			18		1		50		34
11		30		46			19		0		52		14
16		34		49			20		0	b.	10	9	55
21		35		51			20		1		12		32
26		34	decr.	2			20		2		18		12

1760. July hath XXXI Days.

Laſt Quarter, 6th, 15 m. paſt midnight New Moon, 12th, 52 m. paſt 3 aftern. Firſt Quarter, 19th, 36 m. paſt 11 night Full Moon, 28th, 26 m. paſt 1 morn.	*Sun* enters ♌ 22d. 1 h. 13 m. Apparent Time.

1	T	Camb. Commencement	3	46	8	14	23	7	10	37	18
2	W	Viſitation of B. V. *Mary*		47		13		2	11	0	19
3	T			47		13	22	57	11	19	20
4	F	*Martin*, B. Cam TermEn.		48		12		52	11	36	21
5	S	Old MIDSUMMER-DAY		49		11		47	11	52	22
6	E	5 Sunday after Trinity		50		10		41	Morn.		23
7	M			50		10		34	0	8	24
8	T			51		9		28	0	26	25
9	W			52		8		21	0	51	26
10	T			53		7		13	1	22	27
11	F			54		6		5	2	7	28
12	S			55		5	21	56	☽ ſets		29
13	E	6 Sunday after Trinity		56		4		47	9	10	1
14	M	Oxford Act		57		3		38	9	43	2
15	T	*Swithin*, B. of *Wincheſter*		58		2		28	10	11	3
16	W			59		1		18	10	27	4
17	T		4	0		0		8	10	41	5
18	F			1	7	59	20	58	10	56	6
19	S	Oxford Term Ends		2		58		47	11	12	7
20	E	7 S. aft. Trin. *Margaret*		3		57		35	11	27	8
21	M			5		55		24	11	45	9
22	T	Ps. C. Mat. Bo. *Magdalen*		6		54		12	Morn.		10
23	W			7		53		0	0	6	11
24	T			9		51	19	47	0	35	12
25	F	St. JAMES, Apoſtle		10		50		34	1	12	13
26	S	St. *Anne*, Mother of V. M.		12		48		21	1	58	14
27	E	8 Sunday after Trinity		13		47		8	2	54	15
28	M			15		45	18	54	☽ riſes		16
29	T			16		44		40	9	3	17
30	W	Dog-Days Begin		17		43		25	9	26	18
31	T			18		42		10	9	46	19

Days	L. of D.		Day dec.		D. breaks		Sun Eaſt.		Tw. ends.		Clo. bef. S.		7 Stars So.	
1	16	29	0	6			7	19			3 b.	18	8 M	51
6		20		15	No real			18	No real		4	11		31
11		12		23				16				56		10
16		2		33	Night.			13	Night.		5	30	7	50
21	15	50		51				9				51		30
26		36		59	0	46		5	11	11		57		10

1760. Auguſt hath XXXI Days.

Laſt Quarter, 4th, 49 m. paſt 5 morn.
New Moon, 11th, 48 m. paſt midnight
Firſt Quarter, 18th, 36 m. paſt 4 aftern.
Full Moon, 26th, 31 m. paſt 1 aftern.

Sun enters ♍
22d. 7 h. 30 m.
Apparent Time.

1	F	Lammas-Day	4	20	7	40	17	55	10	2	20
2	S			21		39		40	10	18	21
3	E	9 Sunday after Trinity		23		37		24	10	37	22
4	M			24		36		8	11	9	23
5	T			26		34	16	51	11	29	24
6	W	*Transfiguration*		27		33		34	Morn.		25
7	T			29		31		17	0	6	26
8	F			31		29		0	0	52	27
9	S			33		27	15	43	1	56	28
10	E	10 S. aft. Trin. St. *Laurence*		34		26		25	3	10	29
11	M	Princeſs Auguſta Born		36		24		7	☽ ſets		30
12	T	Old Lammas-Day		38		22	14	49	8	18	1
13	W			39		21		31	8	45	2
14	T			41		19		13	9	2	3
15	F	*Aſſumpt. B. Virgin* Mary		43		17	13	54	9	17	4
16	S			45		15		35	9	32	5
17	E	11 Sunday after Trinity		46		14		16	9	50	6
18	M			48		12	12	57	10	10	7
19	T			50		10		37	10	36	8
20	W			52		8		17	11	10	9
21	T			54		6	11	57	11	53	10
22	F			56		4		37	Morn.		11
23	S			58		2		16	0	44	12
24	E	12 Sund. after Trin. St. [Bartholomew, Apoſtle	5	0		0	10	55	1	48	13
25	M			1	6	59		34	3	1	14
26	T			3		57		13	☽ riſes		15
27	W			5		55	9	52	7	53	16
28	T	*Auguſtine*		7		53		31	8	11	17
29	F	St. John Baptiſt *Beheaded*		9		51		10	8	28	18
30	S			11		49	8	48	8	46	19
31	E	13 Sunday after Trinity		13		47		27	9	8	20

Days	L. of D.	Day dec.	D. breaks	Sun Eaſt	Tw. ends	C. bef. S.	7 Stars So.
1	15 18	1 17	1 24	7 0	10 33	5 h. 46	6 M 46
6	2	33	44	6 55	13	19	27
11	14 44	41	2 2	50	9 56	4 39	8
16	38	2 7	20	45	38	3 45	5 49
21	10	25	35	39	23	2 37	30
26	13 51	44	50	34	9	1 34	12

1760. September hath XXX Days.

Laſt Quarter, 2d, 17 m. paſt 11 morn.
New Moon, 9th, 49 m. paſt 11 morn.
Firſt Quarter, 17th, 23 m. paſt 11 morn.
Full Moon, 25th, 20 m. paſt midnight

Sun enters ♎
22d. 3 h. 42 m.
Apparent Time.

1	M	*Giles*, Abbot	5	15	6	45	8	5	9	34	21
2	T	London Burnt, 1666, O.S.		16		44	7	43	10	10	22
3	W			18		42		21	10	57	23
4	T			20		40	6	59	11	56	24
5	F			22		38		37	Morn.		25
6	S	[End		24		36		14	1	6	26
7	E	14 S. aft. Tr. Dog-Days		26		34	5	52	2	20	27
8	M	*Nativity of B. V.* Mary		28		32		29	3	37	28
9	T			30		30		6	☽ sets		29
10	W			32		28	4	43	7	13	1
11	T			34		26		19	7	29	2
12	F			36		24	3	57	7	45	3
13	S			38		22		34	8	2	4
14	E	15 Sun. aft. Trin. *Holy-*		40		20		11	8	21	5
15	M	[*Rood Day*		42		18	2	48	8	45	6
16	T			44		16		25	9	14	7
17	W	Ember Week. *Lambert*, B.		46		14		1	9	53	8
18	T			48		12	1	38	10	40	9
19	F			50		10		14	11	41	10
20	S			52		8	0	51	Morn.		11
21	E	16 S. aft. Tr. St. Matthew		54		6		28	0	49	12
22	M			56		4		5	2	4	13
23	T			58		2	0S	19	3	21	14
24	W	Equal Day and Night	6	0		0		43	4	41	15
25	T			2	5	58	1	6	☽ rises		16
26	F	*Cyprian*		4		56		30	7	0	17
27	S			6		54		53	7	20	18
28	E	17 Sunday after Trinity		8		52	2	17	7	47	19
29	M	St. MICHAEL		10		50		40	8	20	20
30	T			11		49	3	3	9	2	21

Days	L. of D.		Day dec.		D. breaks		Sun Eaſt		Tw. ends		Clo. aft. S.		7 Stars So.	
1	13	28	3	7	3	7	6	27	8	53	0 a.	28	4 M	50
6		10		25		21		21		39	2	6		32
11	12	50		45		34		14		26	3	48		14
16		30	4	5		45		8		15	5	32	3	56
21		11		25		56		2		4	7	15		39
26	11	50		45	4	7	5	56	7	53	8	58		21

1760. October hath XXXI Days.

Laſt Quarter, 1ſt, 55 m. paſt 5 aftern.
New Moon, 9th, 59 m. paſt 1 morn.
Firſt Quarter, 17th, 11 m. paſt 6 morn.
Full Moon, 24th, 45 m. paſt 10 morn.
Laſt Quarter, 31ſt, 33 m. paſt 2 morn.

Sun enters ♏
22d. 11 h. 17 m.
Apparent Time.

1	W	*Remigius,* Biſhop	6	13	5	47	3	27	9	56	22
2	T			15		45		50	11	2	23
3	F			17		43	4	13	Morn.		24
4	S			19		41		36	0	12	25
5	E	18 Sunday after Trinity		21		39	5	0	1	25	26
6	M	*Faith,* Virgin and Martyr		23		37		23	2	40	27
7	T			25		35		46	4	2	28
8	W			27		33	6	9	5	21	29
9	T	St. *Dennis*		29		31		32	☽ ſets		30
10	F	Old Mich. Day. Ox. and		31		29		54	6	12	1
11	S	[Camb. Terms Begin		33		27	7	17	6	32	2
12	E	19 Sunday after Trinity		35		25		39	6	55	3
13	M	*Edward,* King and Martyr		37		23	8	2	7	21	4
14	T			39		21		24	7	55	5
15	W			41		19		46	8	38	6
16	T			43		17	9	8	9	32	7
17	F	*Etheldred,* Virgin		45		15		30	10	36	8
18	S	St. LUKE, Evangeliſt		47		13		52	11	46	9
19	E	20 Sunday after Trinity		49		11	10	14	Morn.		10
20	M			51		9		36	1	3	11
21	T			53		7		58	2	22	12
22	W	K. GEORGE II. Crow.		55		5	11	20	3	43	13
23	T			57		3		41	5	4	14
24	F			59		1	12	1	☽ riſes		15
25	S	*Criſpin*	7	1	4	59		22	6	5	16
26	E	21 Sunday after Trinity		3		57		42	6	32	17
27	M			5		55	13	2	7	9	18
28	T	St. Simon *and* St. Jude, Ap.		6		54		22	7	53	19
29	W			8		52		42	8	47	20
30	T			10		50	14	1	9	53	21
31	F			11		49		21	11	2	22

Days	L. of D.		Day dec.		D. breaks		Sun Eaſt.		Tw. ends.		Clo. aft. S.		7 Stars So.	
1	11	32	5	3	4	19	5	50	7	41	10	35	3	M 3
6		22		23		30		44		30	12	4	2	45
11	10	52		43		40		37		20	13	24		26
16		32	6	3		50		31		10	14	31		7
21		12		23		59		25		1	15	23	1	49
26	9	52		43	5	8		19	6	52		57		28

1760. November hath XXX Days.

New Moon, 7th, 1 m. paſt 7 night. Firſt Quarter, 15th, 18 m. paſt 11 night. Full Moon, 22d, 1 m. paſt 9 night. Laſt Quarter, 29th, 58 m. paſt 1 aftern.	*Sun* enters ♐ 21ſt, 7 h. 8 m. Apparent Time:

1	S	All Saints	7 13	4 47	14 41	Morn.	23
2	E	22 S. aft. Trin. All Souls	15	45	15 0	0 12	24
3	M	On mor. of All Souls, 1 Ret.	17	43	19	1 23	25
4	T		19	41	37	2 35	26
5	W	Powder-Plot, 1605, O. S.	20	40	55	3 44	27
6	T	Michaelmas Term Begins	22	38	16 13	4 55	28
7	F	Pr. Henry Frederick Born	23	37	31	☽ ſets	29
8	S		25	35	48	5 6	1
9	E	23 Sunday after Trinity	27	33	17 4	5 24	2
10	M	K. Geo. II. Bo. L. Mayor's	29	31	23	5 54	3
11	T	St. *Martin* [Day at *Lond.*	30	30	39	6 32	4
12	W	On the mor. of St. *Martin*,	31	29	55	7 23	5
13	T	*Britius*, Biſhop [2 Ret.	33	27	18 11	8 22	6
14	F		35	25	27	9 29	7
15	S	*Machutus*, Biſhop	36	24	42	10 41	8
16	E	24 Sunday after Trinity	37	23	57	11 55	9
17	M	*Hugh*, Biſhop of *Lincoln*	39	21	19 12	Morn.	10
18	T	In 8 days of S. *Martin*, 3 Ret.	41	19	26	1 12	11
19	W		43	17	40	2 32	12
20	T		44	16	54	3 57	13
21	F	*Edmund*, King and Martyr	45	15	20 8	5 24	14
22	S	*Cecilia*, Old Martinmas-Day	47	13	20	☽ riſes	15
23	E	25 S. aft. Trin. St. *Clement*	48	12	32	4 43	16
24	M		50	10	44	5 31	17
25	T	P. Wil. Hen. B In 15 days	51	9	55	6 38	18
26	W	[of St. *Martin*, 4 Ret.	52	8	21 7	7 45	19
27	T		53	7	18	9 4	20
28	F	Michaelmas TERM Ends.	54	6	23	10 24	21
29	S	[Ps. Dow, Wales Bo.	55	5	38	11 40	22
30	E	Advent-Sund. St. Andrew.	57	3	48	Morn.	23

Days	L. of D.		Day dec.		D. breaks		Sun	Eaſt.	Tw. ends.		Clo. aft. S		7 Stars So	
1	9	32	7	3	5	17	5	13	6	43	16 a.	14	1	M.
6		14		21		24		7		36		6	0	47
11	8	58		38		30		2		30	15	38		27
16		43		52		36	4	57		24	14	48		6
1		28	8	7		43		53		17	13	38	11	41
26		15		15		49		49		11	12	8		20

760. December hath XXXI Days.

w Moon, 7th, 7 m. paſt 2 aftern. ſt Quarter, 15th, 17 m. paſt 2 aftern. l Moon, 22d, 26 m. paſt 7 morn. t Quarter, 29th, 59 m. paſt 4 morn.	*Sun* enters ♑ 20th. 19 h. 12 m. Apparent Time.

M		7	58	4	2	21	58	0	56	24
T			59		1	22	7	2	8	25
W		8	0		0		15	3	19	26
T	*Barbara*		1	3	59		23	4	30	27
F			2		58		30	5	40	28
S	*Nicholas*, Biſhop		3		57		37	6	50	29
E	2 Sunday in Advent		3		57		43	☽	ſets	30
M			4		56		49	4	26	1
T			5		55		56	5	[illegible]	[illegible]
W			5		55	23	1	6	7	3
T			6		54		6	7	9	4
F			6		54		11	8	20	5
S	*Lucy*, Virgin and Martyr		7		53		15	9	33	6
E	3 Sunday in Advent		7		53		18	10	48	7
M			7		53		21	Morn.		8
T	Cambridge Term Ends		8		52		23	0	4	9
W	Ember Week. Ox. Term [Ends		8		52		25	1	20	10
T			8		52		27	2	42	11
F			8		52		28	4	6	12
S			8		52		29	5	34	13
E	4 S. in Adv. St. Thomas. [Shorteſt Day		8		52		29	7	0	14
M			8		52		28	☽	riſes	15
T			8		52		27	5	7	16
W			8		52		25	6	27	17
T	CHRIST-MASS-DAY		7		53		23	7	49	18
F	St. STEPHEN		7		53		21	9	11	19
S	St. JOHN		7		53		18	10	28	20
E	1 S. aft. Chr. H. Innocents		6		54		15	11	42	21
M			6		54		11	Morn.		22
T			5		55		7	0	54	23
W	*Sylveſter*		5		55		3	2	6	24

L. of D.		Day, decr.		D. breaks		Sun	Eaſt.	Tw.	ends	Clo.	aft. S.	7 Stars	So.
8	3	8	3[illegible]	5	55	4	46	6	5	10 P.	19	10 A.	59
7	54		[illegible]		58		43		2	8	25		37
	47		48		59		41		1	5	58		15
	43		52	6	0		40		0	3	35	9	53
	43		52		1		40	5	59	1	4		31
	45	Incr.	2		0		40	6	0	1 b.	27		0

Chronological NOTES for the YEAR 1760.

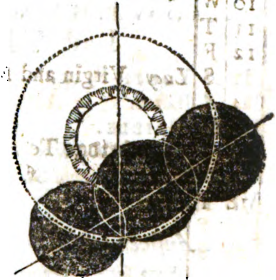
Golden Number	13	Shrove-Tueſday	*Feb.* 19
Cycle of the Sun	5	Eaſter-Day	*April* 6
Epact	12	Whit-Sunday	*May* 25
Roman Indiction	8	Trinity-Sunday	*June* 1
Dominical Letters	F. E.	Advent-Sunday	*Nov.* 30

ECLIPSES in the YEAR 1760.

THERE will, in the Courſe of this Year, be Four Eclipſes; Two of the *Sun*, and as many of the *Moon*; Three of which will be Viſible to the Inhabitants of *Great-Britain*: The Calculations whereof from *Mayer's* Tables, for the Meridian and Latitude of *London*, are as follow:

The Firſt is a very ſmall Eclipſe of the *Moon*, *May* 29th. in the Evening; Beginning at 9 h. 14m. the Middle at 9h. 34m. the End at 9h. 54m. Apparent Time; The Duration being only 40m. and the Quantity Eclipſed $\frac{1}{3}$ of a Digit.

The Second is a *Solar* Eclipſe, *June* 13th. in the Morning; Beginning at 6 h. 39'. 58''. the greateſt Obſcuration at 7 h. 25'. 26''. and the End at 8 h. 12'. 30''. Apparent Time; the Duration 1 h. 32'. 32''. and the Digits Eclipſed 4°. 33'.—This Eclipſe (whoſe Appearance *here*, is exhibited by the Type in the Margin) will be Total in the *Leſſer Aſia*; and the Central Shade will nearly traverſe the ſame Rout with that celebrated Eclipſe of Antiquity, *May* 18th *An. ante Chr.* 603, which frightned the *Medes* and *Lydians* into a Peace, after a Five Years Obſtinate War.



The Third is an Eclipſe of the *Moon*, *Nov.* 22d. in the Evening; Beginning at 7 h. 43'. the Middle at 8 h. 56'. and the End at 10 h. 3'. Duration 2 h. 25'. Digits Eclipſed 6°. 10'.

The Fourth is an Eclipſe of the *Sun*, *Dec.* 7th, about Two in the Afternoon, but Inviſible to all theſe Northern Parts, by reaſon of the *Moon's* great South Latitude.

GEORGE WITCHELL.

Some other Calculations of the Solar Eclipſe (*June* 13th.) by other Correſpondents, from different Tables, and for different Parts of the Kingdom, are here ſubjoined.

Sun Ecl. *June* 13th. in the Morn		Beg.		Mid.		End		Dur.		Dig. Ecl.	
		h.	m.	h.	m.	h.	m.	h.	m.	h.	m.
By Mr. *T. Harris*, From *Brent's* Tables,	For *London* —	6	37	7	23	8	10	1	33	4	33
	For *Bugbrook*	6	33	7	17	8	4	1	31	4	12
By Mr. *T. Allen*,	for *Spalding* — —	6	38	7	26	8	17	1	39	5	10
By Mr. *J. Goodhead*,	for *Nottingham*,	6	35	7	16	8	8	1	33	4	24

Other Calculations of this ECLIPSE have been receiv'd, but ſo very incorrect, and wide of the Truth, that it would do the Authors no Credit to inſert them here.

Une Enigme Francoiſe, *par M.* ALICIA WYLD.

Quand j' étois en Perfection, et paroiſſois dans ma plus grande Splendeur ; je pouvois, comme vous, belles *Dames*, me uſanter d'une Contexture curieuſe, d'un beau Teint, et d'une Innocence ſans Tache. Ces rares Talents m'ont recommandé tant à votre Faveur et Agrément ; que je ſuis devenu votre Compagnon intime, par Jour et par Nuit, en Public et en Secret. Malheureuſe Indulgence ! elle m'a rendù peu utile, et mepriſable à ceux qui étoient naguere mes Admirateurs. Ah ! triſte Revers de Fortune, je ſuis tombée en Etat d' Infamie, j'ai ſouffert dans la Flamme, on m'a mis en Priſon avec des Compagnons inexorable, endurcis comme le Rocher, impitoyable et inflexible comme l'Acier. Helas ! quel Changement depuis que j étois tant Careſſée ; autant que de blanc en Noir : On ne daigne pas meme m'appeller par mon premier Nom.

ANSWERS to the ÆNIGMA'S in the Laſt YEAR's DIARY.

I. *A* TOOTH-PICK.
II. *A* BALL.
III. *A* BRIDLE.
IV. *A* HIGH-CROWN'D HAT.
V. *A* TEA-CUP *and* SAUCER.
VI. HAIR.
VII. *A* FEATHER-BED.
VIII. *A* TAIL.
IX. *A* WATER-ENGINE.
X. DEATH.
Prize. The SABBATH-DAY.

Anſwer to the Prize Ænigma, *by* Morris Applin.

Sure ſuch a gay and modeſt Vail
To pleaſe the *Ladies* cannot fail ;
Your Riddle, Sir, we muſt confeſs,
Is in a pretty SUNDAY's Dreſs.

The ſame anſwer'd by Mr. Barns Moyſe, *To the Propoſer.*

O! teach my Mind, Harmonious *Moore*,
Thy vertuous Warmth to ſhare ;
Then my own Breaſt wou'd I explore,
And feel a SABBATH there.

To the Author *of the* DIARY,

Gude Sir,

GIN I hae gueſs'd your Reedling reight, and ye tak't into your muckle brain Head to obleege a canny bra Laſſie, by putting it into your neiſt Year Buke, ye ſa'l hae a the muckle deal Wiſhes of, *Gude Sir,* BESSIE.

As SUNDAY gane, I went frae Kirk,
Whae met me but my *Willie*!
I ken'd him far, which gar'd me ſmirk,
And Heart loupt in my Belly.

My blubber Lips ſoo aft he kiſt,
I gloum'd and cry'd 'twas ſilly;
Then ſpeir'd whae *Beſſie* lood the beſt?
Beſs ſeigh'd, for whae but *Willie*.

Beſſie.

Another Anſwer to the ſame.

God's holy SABBATHS with due Rev'rence prize,
And high Injunctions view with *ſpir'tual* Eyes;
That done, O mortal Man! aſſign the reſt
To his wiſe Providence, who knows what's beſt.

Somebody.

The ſame anſwered by Mrs. M. W.

The SABBATH keep, in *Virtue's Cauſe* be wiſe;
And endleſs Bliſs will be th' important *Prize*.

The ſame anſwered by Mr. J. Johnſon.

The SABBATH was (it is confeſt)
Ordain'd by *God*, for *Pray'r* and *Reſt*:
We *keep it* --- but a diff'rent Way---
In *Feaſting*, *Riot*, *Routs*, and *Play*.

An Acroſtical Anſwer to the ſame, by Yorkſhire Tyke.

S ov'reign prime *Cauſe*! pure *Eſſence* uncreate!
U ne!--- and yet *Tri-Une*!---Myſtery unfathom'd!
N or Heighth, Depth, Breadth, nor vaſt Eternity
D eclare a Limit to thy *Omnipreſence*:
A ll Nature's at thy Nod; preſent to *Thee*,
Y ears paſt, and unrevolv'd, at once appear.

A General Anſwer to all the Ænigmas, as they ſtand in order, by Mr. Samuel Bentley.

Dear *Ladies*!---I'll draw you a Sketch of a *Rake*---
Thin and pale, like his TOOTH-PICK ---a *Baboon* in make: 1
He holds for his *Creed*, 'twas Chance form'd this BALL: 2
His Tongue's without BRIDLE, all *Lewdneſs* or *Gall*. 3
Damns his *Grandmother's* HAT, and each ſober Faſhion. 4
Breaks Windows or CHINA, in Sport, or in Paſſion; 5
Beats Watchmen and *Drawers*, kicks Dreſſers of HAIR; 6
Goes to BED, and gets up, you may gueſs, without Prayer: 7
With Fire-TAIL'd *Drabs* runs the Riſk and will wench it, 8
Till all of a Flame --- and no ENGINE can quench it. 9
Quite rotten, ere long, he is ſeiz'd by grim DEATH; 10
Thus the vain SABBATH-Breaker reſigns his laſt Breath. *Prize.*

All the Ænigmas and Rebuſes anſwered by Roſalinda, To the Lady Diaria.

Sure, *Madam*, 'tis Time to leave your gay Tricks,
And think of Grey-HAIRS --- you're now Fifty-ſix: 6
Yet like a briſk, active young Girl of Fifteen,
You whiſk a gay BALL with the *Youths* o'er the *Green*; 2

Still witty as ever, and full of your *Jokes*,
As Witneſs the TOOTH-PICKS, large HATS and long *Cloaks*, 1. 4.
A SABBATH-DAY's Dreſs for the Ladies of *Yore*, *Prize*.
Ere TEA and French Faſhions had found their Way o'er. 5
But pray, my dear *Madam*, what had you to do
With the Monkey-TAIL'd Tribe, or the ſtarch'd Female-Crew? 8
'Twere prudent to BRIDLE that ENGINE your Tongue, 3. 9.
If you'd DIE in your BED---and hope to live long; 10. 7.
Tho' Numbers wou'd ſpend (ſuch it ſeems are your Merits)
Their laſt Drop of *Harts-horn*, to keep up your Spirits.
Tim Sadler's your Lover, 'tis at *Sevenoak* ſaid-- Reb. 3 2.
By Great *Alfred*'s Soul, I commend the bold Blade: Reb. 1.
How few, beſides *Tom*, wou'd in chooſing their *Honey*,
Prefer Wit in Rags, to *Viragos* with Money!

All the Ænigmas anſwered by Mr. Richard Gibbons.

A *Tooth-Pick* and a Tennis *Ball*, 1. 2.
A *Bridle*, High-Crown'd-*Hat*, withal, 3. 4.
A China *Pot* and *Pan*, Sir, 5.
A Lock of *Hair*, and *Feather'd Neſt*, 6. 7. Bed.
A *Tail*, an *Engine*, *Death*, and *Reſt*, 8, 9, 10. *Prize* Sabbath.
Do all your Riddles anſwer.

All the Ænigmas, Rebuſes, and the 4th Quære anſwered by F. F. Mingle, To Mr. Thomas Sadler at the King-Alfred's Head in Sevenoak.

Sir, I've try'd your *Quære* to unfold,
And, of two Plagues, prefer the *Scold*:
A *Wife* that's ſubject to be *drunk*
May ſoon commence an arrant *Punk*,
All other Vices crowd upon her,
Your Wealth ſhe'll waſte, your BED diſhonour, 7.
Regardleſs of what's done or ſaid,
For, ENGINE like, ſhe muſt be fed; 9.
In vain you rage and ſpend your Breath,
There is no other Cure but DEATH.—— 10.
The Tongue o'th' *Scold*, tho' ſeldom idle,
A prudent Man may ſtrangely BRIDLE: 3.
His Study he ſhould make to pleaſe her,
Know what ſhe likes, and what wou'd teize her;
Sometimes a Trifle, in the Nick,
A CHINA Toy, or a TOOTH-PICK, 5. 1.
A Tippet fine (like TAIL of HAIR) 8. 6.
Or Pair of Shoes for SUNDAY's wear, *Prize*.
A HAT i'th' Mode, a Treat, or BALL, 4. 2.
Will quell a dang'rous threat'ning Squall.
---Thus, Sir, were One to be my Choice,
The *Scold*, you ſee, wou'd have my Voice.

All the Ænigmas anſwered by Mr. Tho. Baker, of Wickam Market, Suffolk, on the Death of the Rev. Mr. Hervey, Author of the Meditations among the Tombs, &c.

On *Chriſtmas-Day*——that happy Day to All!
Dear *Hervey* left this gloomy tranſient BALL; 2.
All-conquering DEATH did then aſſert his Right, 10.
And waft his Soul to endleſs Realms of Light:
Yet ſtill we ſee him in his ſacred Page,
Form'd to delight at once and mend the Age.
Whether to *Gardens*, or to *Tombs*, we go,
We find *His Meditations* ſweetly flow;
The ſtarry Heavens, and the gloomy Night,
Deck'd with his *Language*, yield us new Delight.——
Next, how his *Theron* and *Aſpaſia* ſhines,
With heav'nly Graces, in Seraphic Lines.
What ENGINES theſe, to BRIDLE vain Deſires, 9. 3.
And warm our Souls with ſweet, celeſtial Fires!
O! may his *Lays* more charm th' attentive *Fair*, [6. 4. 1. 5.
Than CURLS, HATS, TOOTH-PICKS, or their CHINA-WARE;
Then no TAIL'd *Fop* ſhall ſhare their virtuous BEDS; 8. 7.
Nor Guilt, for SABBATHS ſcorn'd, hang o'er their Heads: *Prize.*
But when Life's frail uncertain Thread ſhall break,
They ſhall, with *Hervey*, heav'nly Joys partake.

In this Manner, all, or moſt of the Ænigmas are anſwered by Mr. *W. Bamfield*, Mr. *Edward Barraſs*, Mrs. *Eliz. Goſling*, Mr. *T. Harris*, Mr. *Ja. Hayden*, Mr. *G. Hicks*, *Hippocrates*, Mr. *J. Holliday*, Mr. *Abr. Horsfall*, Mr. *W. Ingram*, Mr. *G. Langley*, Mr. *J. Lyon*, Mr. *R. Marſh*, Miſs *Ann Nicholls*, Mr. *J. Ramſay*, Mr. *T. Sadler*, Mr. *T. Sandling*, Miſs *Eliz. Stevenſon*, Mr. *Richard Shillito*, Mr. *W. Spicer*, Mr. *Iſaac Tarrat*, Mr. *T. Vaughan*, Mr. *W. Wyld*, and ſome others: whereof the greater Part might very well bear to ſee the Light, were it not inconſiſtent with our Plan, and narrow Limits, to dwell longer on this Subject.

⁂ The two Prizes of 10, and of 8 Diaries, for the Solution of the Prize Ænigma, were won by Mr. *J. Draper* and Mr. *T. Kennerdy*. The two New Prizes of 10 Diaries each (to be determined by Lot to two of the Six beſt General Solutions of the Ænigmas) were won by Mr. *Samuel Bentley* of *Uttoxeter*, and *F. F. Mingle*. —Theſe Prizes may be received of Mr. *Hett* at *Stationer's-Hall*; or will, otherwiſe, be delivered in any other Part of Town, if deſired.

The Prize of 12 Diaries, for the Solution of the Prize Queſtion, is the Lot of the ingenious Mr. *O'Cavanah* of *Dublin*.

ANSWERS to the QUERIES and REBUSES in the laſt Year's DIARY.

I. Quere *anſwered by Mr. Richard Gibbons.*

The moſt that can be ſeen in the *Former*, is the *Libertine* in the moſt glaring Light, whoſe Principles render him ſo very obnoxious to Society, as to produce even Good out of Evil: But as to the *Latter*, Experience hath ſhewn us, that one ſingle Perſon may eaſily infect an *Aſſembly*, and the Contagion ſpreading, the *Community* may be ſo far infatuated, as to overturn the Conſtitution, make and break Laws at Pleaſure; and, being no longer reſtrained, it is no Wonder to ſee Racks and Tortures, Fire and Faggot, Treaſon, Rebellion and murdered Kings, the Subjects of ſuch pious Frenzy; of which this Nation hath had woeful Experience, in the Reign of *Mary* the Firſt, and the Uſurpation of *Cromwell*.

Mr. *Wyvell Blennerhaſſet*, in Anſwer to this *Quære*, alſo expreſſes himſelf extremely well, to the ſame Purpoſe: He obſerves, that Vice unreſtrained, however it may affect the really Vicious, will, in a virtuous Mind, create an Abhorrence of its Deformity. An *unbounded Zeal* (He adds) is commonly Nothing more, than the Reſult of an *unbridled Reaſon*: For when the Head is weak, and the Mind becomes warm in her Devotions, ſhe is apt to imagine herſelf inſpired by a Divine Impulſe,--- The Influence of Paſſion, Imagination, and Conſtitution, ought therefore, at all Times, to be carefully guarded againſt.

Eſt Modus in rebus; ſunt certi denique fines,
Quos ultra citraque nequit conſiſtere rectum.
HOR.

II. Quære *anſwered by Mr. Charles Hutton*.

When we, to th' Ear, our Thoughts declare,
Our *Tongue* is made the Speaker;
But when to th' Eyes, O! ſtrange Device!
Our *Pen* diſplays the *Picture*.

The ſame anſwered by Mr. Morris Applin.

The Art of WRITING was to Mortals taught,
To repreſent the *Picture* of the *Thought*:
Indeed 'twere happy, lovely *Fair*, for You,
If always *Man* a real Likeneſs drew.

III. Quære *anſwered by Mr. W. Snaith*.

If Men ſhould leave off to wooe the Women, I think the Women would not fail to wooe them; and, perhaps, with more than equal Succeſs.

The ſame anſwered by Roſalinda.

Were the Men not to wooe us, you aſk, what we'd do?
Gods! I'll tell --- tho' I bluſh, red as *Rubies*---
You ſhou'd find we *wou'd* wooe---and better than You,
For we'd take no Denial--- ye *Boobies*.

IV. Quære *anſwered by Mr. Richard Gibbons*.

It is ſeldom that the *Scold* has more than one bad Quality, or the *drunken Wife* a ſingle good one: The former, generally ſpeaking, is cleanly, careful, and thrifty; the latter more naſty than a Beaſt, and not only a continual Conſumer, but incapable of diſcharging the common Duties of Life.

Mr. *J. Lyon* anſwers this Quære, much in the ſame Manner; and farther takes Notice, what a cruel Sight it muſt be to the Huſband, to behold the Woman whom he, perhaps, loves with an Exceſs of Tenderneſs, metamorphos'd into a Beaſt; and expoſed to the Indignities and Seductions of looſe Companions and the Betrayers of Virtue.

V. Quære

V. Quære *anſwered by F. F. Mingle.*

The moſt general Opinion is, that this Cuſtom had its Riſe in the Reign of King *Richard* the *Third*: who was not only deformed himſelf, but had ſeveral *Lords* in his Court bearing about them the ſame natural Blemiſhes; whom he had raiſed to that Rank: And ſuch (it is ſaid) was the extreme Complaiſance of his *Courtiers*, that they padded their Cloaths, in order to look as much like his *Majeſty*, as poſſible. The *Commonallty* obſerving this, They, to ridicule the *Court* and the *Nobility* for their groſs Flattery, very liberally beſtowed their Lordſhip's Titles on the Deformed of their own Rank, as Perſons cut out by Nature for thoſe high Honours.

Mr. *W. Davies* thinks, that the mock Title of *Lord*, might owe its Original to the Greek Word λορδὸς; which ſignifies *crooked*. And Mr. *E. Langworthy* is alſo of the ſame Opinion.

Equidem, Domine, quod à Græco Adjectivo, λορδὸς (*Curvus*) ludicrum nomen, *Lord*, originem deducant, ſic mihi videtur; celeberrimus enim *Hippocrates* pro gibboſo Homine illo utitur.

E. Langworthy.

VI. Quære *anſwered by Mr. T. Sandling of Hindringham, Norfolk.*

This Effect ſeems to be owing to Electricity, or to the elaſtic Steam of the Water (or, perhaps, to both together.) So long as every Part of the Glaſs continues to be acted on alike, *it* can have no other Tendency to break, than what may, perhaps, ariſe from it's Figure. But on the Application of any cold Subſtance to ſome particular Part thereof, the *Equilibrium* is inſtantly deſtroyed (as is the Caſe when a Stroke is received from an electrified Body) and then it is no Wonder to ſee the Glaſs fall in Pieces.

VII. Quære *anſwered by Mr. W. Litſon.*

This *Phænomenon* muſt, undoubtedly, be accounted for, from the different Effect of the Solar Rays on the Congeries of ſmall tender Tubes, whereof the Stems of the Plants are compoſed: But, how the Texture and Modification of theſe differ, ſo as to cauſe, in different Plants, a particular Tendency to an *Incurvation*, in a Direction with, or contrary to that of the Sun's Motion, through the Action of his Rays; muſt be left to more ſubtile and minute Enquirers into Nature.

Had J. C. B, who ſent an Anſwer to the 5th Quære, tranſcribed out of a certain Book, informed us (inſtead thereof) that ſuch a Thing was already in Print, it would have been kind.---This Diſcovery we owe to Mr. Chr. Maſtan; and we acknowledge the Obligation.

I. Reb. *anſwered by Richard Rhyme.*

Ale is a Liquor in great Reputation,
And *Fir* is a Wood of much uſe to the Nation,
And *Red* is the Colour, by which will be found
That Alfred's the Monarch, in Hiſt'ry renown'd;

The ſame anſwered by Mr. Jos. Ruſton.

The Liquor is *Ale*, the Colour is *Red*,
The Wood it is *Fir*, and the Name is ALFRED.

The ſame anſwered by Mr. W. Wyld.

Great ALFRED, here the God-like Monarch's found,
For *Wiſdom*, *Valour*, *Piety* renown'd.

II. Reb. *anſwered by Mr. Samuel Harlock, To the Propoſer.*

The Number is *Seven*, and *Oak* is known well;
So your charming bright Laſſes at *Sevenoak* dwell.

III. Reb. *anſwered by Mr. J. Nunn.*

In vain I ſought your Di'ry round,
'Till *Thomas Sadler* there I found.

A General Anſwer to all the Rebuſes by Mr. Abr. Horſfall.

Great ALFRED (Sir) the *Firſt* I've reckon'd,
And *Sevenoak*, I call the *Second*;
And, by the *Third*, I apprehend
Dom. SADLER is your Di'ry's Friend.

Another by Miſs Sally Edge (a young Lady of Thirteen.)

King *Alfred* reign'd in great Renown, as ancient Records tell:
At *Sevenoak*, I make no Doubt, but Laſſes bright may dwell.
Two I've explain'd, I'll think again, if this will give me Fame ---
What better can unfold the Third, than your Friend *Sadler*'s Name?

New ÆNIGMAS to be ANSWERED in the next YEAR'S-DIARY.

I. Ænigma 421. by *Cælia.*

In a fam'd Tower, built by no vulgar Hand,
I and my Siſter jointly bear Command;
There, like Twin Queens, we reign in lofty State,
And all our Subject's Movements regulate.
We hold ſtrict Commerce with the Female Soul,
Rarely, the Fair, our mighty Sway controul;
With Joy, elate; depreſs'd, at Sight of Woe;
We melt in Pity, and with Rage we glow.
None e'er in Arts or Arms a Figure made
Unleſs aſſiſted by our friendly Aid.
Should *Greece*, or our fair *Iſle*, this Truth arraign,
This *Iſle* and *Greece* would but oppoſe in vain.
Whilſt in our Poſts with active Life we ſhine,
To act in Concert, cloſely we combine:
But, one extinct, tho' in the World's wide round
Thouſands of Others might with Eaſe be found,
Yet none ('tis doom'd) can fill the vacant Throne;
The Weight of Empire wholly reſts in one.

II. Ænigma

II. Ænigma 422, by Mr. *A. Moore*.

To You, *ye Fair!* my ſad diſaſtrous Woes,
Without Offence, permit me to diſcloſe.
Know, then, with Grief my Parent brought me forth,
Nor ſhone one Star propitious at my Birth!
My Kindred all, my abject State deride,
And vent their haughty Scorn with ruthleſs Pride;
Whilſt of their needful Aid I am bereft,
And to the Care of Strangers often left;
Sometimes an *early* Fate I undergo,
Shame, Rage and Guilt direct the mortal Blow;
Yet for no Fault of mine, this Load ſevere
Of complicated Ill, I'm doom'd to bear.
Not thus unbleſt are all our num'rous Race;
Reſpected ſome --- rais'd high in Pow'r and *Place*,
To *Peers* and *Potentates* are near ally'd,
And in the *Palaces* of *Kings* reſide.
Search *Britain* thro', ſome of our diff'rent Kind
In each parochial Diſtrict you may find;
Where oft domeſtic Quarrels, we excite,
And yield to *Prudes* a barbarous Delight;
Numbers beſides there are, to Fame unknown,
Alliance with us who diſdain to own.

III. Ænigma 423, by *Morris Applin*.

Altho', ye Fair, you ſtrive to mimick me,
Yet what I am, you cannot really be.
Indeed 'tis ſtrange! but very true, to tell
Of all your Charms I'm the Original.
Ere you exiſted, I can boaſt my Race,
That now you meet with in each publick Place,
Deſign'd by Heav'n to be your prudent Guide,
But am the Spring that moves you moſt to Pride.
As for my Form, a ſtately Thing I am,
A numerous Tribe are thoſe that bear my Name.
Some great, ſome ſmall, and ſome mere Counterfeits;
'Twere happy for you were there no ſuch Cheats.
Now, Ladies, to my Properties attend,
And you'll allow that I am much your Friend,
Soft Muſic would no longer pleaſe your Ear,
Nor Balls, nor Plays, your drooping Spirits cheer,
Nor prat'ling Infants ſcarce attract a Smile,
Should I be baniſh'd from this happy Iſle.
By me you taſte the Vine's nutritious Juice,
And all the Sweets that Parts remote produce;
In ſhort, in your Attire I have a Hand,
And am your humble Servant to command.

IV. Ænigma 424, by Mrs. *Eliz. Goſling*.

Dear Ladies, ſee your *Slave* attend,
Whom oft you deign to own a *Friend*;
Who, tho' the *Beggar*'s common Gueſt,
By *Kings* and *Princes* is careſs'd.

But

But moſt, the *Fair*, my Worth approve,
For I'm a real Friend to *Love*.
But tho' of heav'nly Race deſcended,
Obſerve what Fate has me attended;
With *Traytors* I've been doom'd to dwell,
And thruſt, with *Villains*, in a *Cell*.
Born for Man's Good, him I attend,
A real, tho' deceitful Friend:
I calm the Mind with Ills oppreſs'd,
And dry the Tears of the Diſtreſs'd.
But I've a *Foe*, of Lineage baſe,
Who, if I'm abſent, takes my Place:
When I return, he takes his Flight;
His Deeds are far too black for Light.
Dear *Ladies*, pray don't entertain him;
I'm ſure you wou'd not, ſhou'd I name him.

V. Ænigma 425, by Miſs *Hoyden*.

1. As, Ladies, I am oft in Print,
Familiar to your Eyes,
My well known Form and conſtant Uſe
Will ſcarce permit Diſguiſe.
2. The gayeſt Nymph will bluſh, when I
Appear at Ball or Play;
Ev'n pious Dames, my choiceſt Friends,
Conceal me when they pray.
3. In ſpite of Heralds I uſurp
The honour'd Field of Arms;
Blameleſs however, ſince I guard
The *Fair* from hourly Harms.
4. I too protect the Lover's Brow,
Which elſe might ſhew the Scar,
When his Careſſes rude provoke
The injur'd angry *Fair*.
5. The pointed Shaft by me impell'd
Pervades the flow'ry Lawn,
Pierces the tender Lambkin's Skin,
Nor ſpares the Kid or Fawn.
6. Not Cupid's Bow with ſurer Aim
The fatal Arrow ſends,
Nor Ajax ſevenfold Shield ſo ſure
The Hero's Breaſt defends.

VI. Ænigma 426, by Mr. *Barns Meyſe*.

Various our Size and Colours are,
Some clad in Fur,---and Others bare;
Black, blue, and pye-bald, ev'ry Dye,
That ſpreads the Earth, or paints the Sky:
Yet, what is ſtrange, of all our Kind,
Nor *Males*, nor *Females*, can You find,
Not us, the Joys of Love delight,
To eat's our only Appetite;

For this we climb the prickly Thorn,
And graze along the daiſy'd Lawn;
Now traverſe thro' the ſpringing Wood,
And mount her topmoſt Trees for Food.
Here ſhelter'd, an *Aſylum* find,
From barb'rous Men who hate our Kind.
Some take at Eaſtern Winds Offence,
Thinking our Origin's from thence;
But Men of deep Reſearches know
That Nought ſpontaneous ſprings Below;
But ſtill from kindred Subſtance grows,
Reſembling that from whence it flows:
Yet, not amidſt our numerous Race,
One Parent's Likeneſs can you trace;
Beauteous were they, as early Light
When firſt *Aurora* greets the Sight;
In Gold and Purple's bright Array
Sweet-beaming on the new-born Day.
Whence pratling *Wits*, ye peerleſs *Fair*,
To their frail Form dare your's compare;
Say, when you're dreſs'd for public Shew,
When round you brilliant Splendors glow,
You're like their, elſe, unrivall'd Frame--
Then, from our Parents, tell our Name.

VII. Ænigma 427, by *Clyſterus* of *Cornwall*.

Known were my Virtues, how deſerving Praiſe!
Quite from old *Adam's*, down to *George's* Days:
Friend to Mankind, the Monarch, and the Slave,
The Rich, the Poor, the Coward and the Brave:
By me (ſuch Aid the learned Arts I give)
The Marble breaths, the Canvaſs ſeems to live.
For me the *Fair Ones* in Brocades are gay,
Their pendant Di'monds dart a trembling Ray;
For me their Hairs are taught in Curls to flow,
The Breaſt to whiten, and the Cheek to glow.
Without me, Slave to *Sophia's* Tyrant Pow'r,
Would *Clodio* cringe, and flatter, and adore;
Trip where ſhe treads, where e'er ſhe circles, wheel,
And dangle, like a Lap-dog, at her Heel?
In vain for Conqueſt might the Virgin toil,
Vain the blue Languiſh and alluring Smile,
In vain the dimpl'd Cheek's unrival'd glow,
The Boſom's Beauties and the Waiſt below.
Without me, *Poets*, wou'd your flowing Verſe
The Pleaſures of the rural World rehearſe?
Untold, the Silver Stream had pour'd along,
Groves, Hills, and Valleys, and the Shades unſung,
As much might *Maids* that other Countries boaſt,
Provoke your Wonder as a *Corniſh Toaſt*.
For me alone, *Vauxhall*, thy Gardens bloom,
And Lights, far beaming, all thy Walks illume;
How pleas'd amidſt thy Checker'd Shades to rove,
Yet dead to all the Muſic of the Grove.

VIII. Ænigma 428, by Mr. *J. Wagſtaffe.*

Ladies, you've heard, how late on *Pruſſian* Plains,
Th' unfeeling *Coſſacks* ſerv'd the ſuff'ring Swains:
Ferocious Crew! with Hearts relentleſs ſteel'd,
Seiz'd their laſt Morſel, and deſpoil'd the *Field.*
An equal Ravage our fell March attends,
When, big with Fate, our countleſs Hoſt deſcends;
Not deeper Horror ſtrikes th' aſtoniſh'd Swains,
When Wolves in Troops pour o'er their Flock-ſpread Plains,
Than what they feel, when our voracious Brood
Pitch on their Fields, and ſeek their deſtin'd Food.
Deſcrib'd we ſtand by an inſpir'd *Seer,*
A People great and ſtrong, unknowing Fear;
In firm Battalia form'd and dread Array,
To ſpread Deſtruction, as we urge our Way,
That, where before like *Eden's* Garden ſmil'd,
Should ſhew more hideous than the trackleſs Wild.
Ah! happy *Britain!* greatly-favour'd Iſle,
Whoſe Fruits unravag'd, bid her Natives ſmile;
With Rapture Theſe o'erlook the Globe they've till'd,
Nor doubt the Hand, that ſow'd, ſhall reap the Field.
Yet ſcarce ten Suns have run their Annual Round,
Since here ſome Vagrants of our Tribe were found;
Thouſands with Terror ſaw the Miſcreants ſtray,
But Heav'n benignant ſwept them all away.

IX. Ænigma 429, by Mr. *J. S. Topſham.*

1. *Britain!* ſole Empreſs of the Main!
By me ſend haughty *Louis* Law;
I dare a Sovereign's Right maintain,
And keep a warring World in Awe.
2. *Briareus* had a Hundred Hands,
So I've been told, *Apollodore*;
If my dear Country but commands,
I'll muſter many Hundred more.
3. Like many-headed Hydra, mine
Lopt off, ſpontaneous ſhoot again;
And will, while any of the Line,
Any of *Britiſh* Mould, remain.
4. My Lion-looks, when I appear,
Here, or beyond the torrid Zone,
Horrific, like *Meduſa's* Hair,
Strike the Beholders into Stone.
5. As many Mouths, as Argus Eyes---
I bid---and Lightning fires the Ball;
My rattling Thunders reach the Skies,
And ſhake *Thee* to the Center, *Gaul!*
6. I, like a Hawk, his Game in Sight,
Intrepid, cut my liquid Way;
Flocks of Poltroons, who ken my Flight,
Skud off, or fall an eaſy Prey.

X. Ænigma

X. Ænigma 430, by Mr. *Cha. Wildbore.*

I'm Child to ſomething that's myſterious held,
Involv'd in Darkneſs, not to be diſpell'd;
Buſy, but intricate; by hidden Cauſe
I *Nature* wind --- reciprocate her Laws.
I love the Empire of old ſilent *Night*,
When ſilver *Luna* darts her pallid Light,
E're bluſhing Twilight gilds the upland Lawn,
And ſhrill aërial Warblers hail the Dawn.
As *Ammon's* Eagle ſoars with Pinions bold,
Above thoſe Clouds, the lower Tribes behold;
So *Homer's* Genius riſing heavenly bright,
Unfolds my Nature, in its rapid Flight.
Not airy caſtles can my Make explain,
Nor all the Fictions of *Lucretius'* Brain:
Democritus ſoon ſtumbled at my Laws;
The *Stagirite* himſelf miſtook my Cauſe:
Nor think this ſtrange; for I make *You*, ye *Fair*,
See, without Sight, and without Hearing, hear.
I *Cities* raze, and level lofty Woods,
And over Mountains turn the Courſe of Floods!
Recall to Life!---Make Iron ſwim in Air!
Change *White* to *Black*,---and *Foul* transform to *Fair!*
But yet, not always frantic is my Power;
I've ſav'd a City, in a fearful Hour,
Stopt dreadful Armies, 'ſembling from afar,
Prevented Famine, Cruelty and War.

XI. Ænigma 431, by Mr. *French Johnſon.*

Illuſtrious *Romans* (if you credit Fame)
Honour'd my Virtues, magnify'd my Name,
Enroll'd my Merit in their generous Theme,
Surnam'd me *Guardian*, in the Point Extreme.
But, ſtrange Reverſe! *Now* a degen'rate Race,
Brand me an *Ideot*, mark me with Diſgrace:
Yet know, ye *Fair*, I boaſt a nobler *Fleece*
Than *Witch-Medea* gave the Prince of *Greece*:
The greateſt Bleſſings from my *Staple* flow,
That Mortals can experience here below:
No *Empire* cou'd exiſt without my Aid;
Diſus'd, I cauſe an *Anarchy* in Trade.
My Part inferior, (if inferior 'tis)
Attends the dying Groans---and nuptial Bliſs:
Alike careſſed is, by *King* and *Slave*;
But ſeldom yields Acceſs to th' Midnight Knave,
Or padding *Boſil*, or his ſtrolling *Trull*,
To Eaſtern *Nabob*, or the Great *Mogul*.---
But greateſt Virtues have their weaker Side,
And I, *too oft*, have been the Slave of Pride;
Oft, when provok'd, I prove a raging Evil,
And vent my *Gall* i'th' Language of---*the Devil.*
Name-ſakes I have (Author, drop your Pen---)
Among thoſe Beings, ſome do reckon Men.

Prize Ænigma by Mr. *Samuel Bentley.*

(Whoever anſwers it before Candlemas Day, *has a Chance for* 10, *and another for* 8 *Diaries.)*

Ye lovely Fair --- tho' I'm not made for Shew,
You court my Aid, and my Perfections know:
But moſt on *Beaus* my Services attend;
They ſure will know, and own me for their Friend.
  More ſtrange than I, no Creature e'er was ſeen
In Sea, or Air, wild Waſte, or verdant Green;
In Shape I vary, more than *Harlequin:*
Here --- I appear in White, or Blue, or Red
A Figure odd with Petticoats and Head;
There --- *Urchin* like --- or like the prickly Bur,
Yet am not rough, my Coat's of ſofteſt Fur.
  Sometimes my Body, or my Head, doth fail;
Plumage moſt curious, then adorns my Tail:
When ſuch my Form, I ſerve ſome gentle *Belle*,
And 'midſt ambroſial Sweets immur'd I dwell.
  Sometimes I'm ſeen a moſt voracious Creature,
A Contradiction ev'ry Way to Nature;
For tho' I once have felt the Stroke of Death,
I riſe again, and draw again my Breath;
Now I'm a Dwarf --- now three Times more I meaſure---
Now ſhort, now long---and long, and ſhort, at Pleaſure:
Many ſtrong Ribs extend my Body wide,
And tho' I ever am a Slave to Pride,
Dreſs I diſcard, and ſhew my wrinkl'd Hide.
No Food's too fine for my moſt greedy Maw,
Which I diſcharge as oft, as Breath I draw
Out at my Noſe: and what's for me deſign'd
I ſtill take backwards, for my Mouth's behind.
Such --- I on *Blockheads* wait --- my Uſe the ſame ---
But Ape French Airs, and frenchify my Name.
  Who wou'd walk clean thro' *Edinburgh* ('tis ſaid)
Cries, *haud yoor Haund*, to ſave from Filth his Head:
So *Beaus* ſhou'd ſay: for, ere they join the *Ball*,
'Tis Odds my Excrements bedaub them all.
  Yet this Hint more --- in Name-ſakes I abound
Who boaſt great Worth, yet prove but empty Sound.
Ye Wits, now ſay, what Creature I can be,
For know, all *Riddles* are true Types of me.

The new Ænigmas by Mr. *J. Atkinſon*, Mr. *J. Draper*, Mr. *S. Hammond*, Mr. *W. Wyld*, and two or three Others (which are not inferior to thoſe inſerted *here*) we ſhall reſerve, for another Opportunity.---That by Mr. *T. S---r* (though wrote in very good Language) cannot be printed without ſome Alteration, the Deſcription being much too explicit; which is alſo the Caſe with reſpect to ſome Others.---That by Mr. *J. H---y* would have merited a particular Regard, had the ſame *Spirit* and *Eaſe*, which appear in the former Part, been extended through the whole: But an ill-judg'd Deſign, to introduce into it all the Anſwers to the preceding Year's Ænigmas, has had a bad Effect.---This, it may be believed, is not mentioned to affront a Gentleman whom we ſhould be glad to oblige, on a proper Occaſion: Our Deſign herein is to check and diſcountenance, in general, Attempts of this Nature; which can ſeldom be executed without departing too much from the main Point, diſtorting the Deſcription, and rendering the Diction flat and incoherent.--- Subjects that are in their own Nature, not the moſt important and affecting, require rather to be embelliſhed and enlivened by judicious *Reflections* and *ſtriking Alluſions*, than cramped, and rendered inſupportably harſh and diſguſtful, by aiming at *Singularities.*

NEW QUÆRIES, REBUSES, and PARADOXES to be anſwered in the next *Year's Diary.*

I. Quære, by Mr. *J. Atkinſon.*

Ye ſprightly *Fair*, ſome truthful Reaſon give
Why you refuſe what you wou'd fain receive.

II. Quære, by Mr. *Richard Gibbons*,

Why is a conceited formal pert *Fellow*, called a Coxcomb?

III. Quære, by Mr. *R. Hind.*

For what Reaſon is the *youngeſt Son* of a *Family*, called the beſt *Gentleman*?

IV. Quære, by Mr. *J. Dyke.*

Whether a real Want of Knowledge, or a voluntary Submiſſion to the Dictates of the Paſſions, contributes moſt to lead Mankind into Error?

V. Quære, by Mr. *Barns Moyſe.*

The Sagacity of Birds, in the Concealment of their Eggs and Young, hath been frequently obſerved, and their various Shifts to elude the Searcher's Attention from the real Spot: But the domeſtic *Hen*, contrary to every other Species of Birds, proclaims upon the Spot, by her loudeſt Note *(Cackling)* the Depoſition of every Egg. From whence ariſes this ſingular Inſtinct, and what Purpoſe is it preſumed to anſwer?

VI. Quære, by Mr. *T. Barker.*

What is the beſt approved Remedy for that Impediment in the Speech, vulgarly called Stammering?

1 Reb. by Mr. *J. Atkinſon.*

A Fruit belov'd by ev'ry Swain,
And half a late Commander, ſlain,
Diſcloſe, ye Fair, in Order join'd,
The Town where dwells my *Cælia* kind.

2 Reb. by Mr. *Tho. Sadler.*

An old *batt'ring Engine*, pleaſe firſt to tranſpoſe,
Then, in Order direct, add a *Fun'ral's Cloſe*;
And th' *Abode* of a *Fair one* from thence will appear,
Who had *Sweethearts* nineteen, in the Space of a Year.

3 Reb. by Mr. *Edward Barraſs* of *Cheſter-le-Street.*

Two Thirds of a Number, and *One* of a Wood,
Name a Thing uſ'd by *Ladies*, and held mighty good
To cheer up their Spirits, and quicken the Blood.

4 Reb.

4 Reb. by Mr. *J. S. Topſham.*

Take what *Cloe* ſhou'd to falſe *Thyrſis* have ſaid,
And Two Thirds o'th' Anſwer he preſs'd from that *Maid*;
Then tack them together --- who looks but aſquint,
May ſee both the Sides of what's meant by this Hint.

1 Paradox, by Mr. *S. Hammond* of *Nottingham.*

In *only One*, I'll prove there's *None*,
In *Seven*, *Five*, no more;
But (without Tricks) there's *Nine* in *Six*,
Altho' in *Five*, but *Four.*
What I've above propoſed to prove
Is *literally* true:
And hope next Year, ye *Artiſts* rare,
'Twill be reſolv'd by You.

2. A Geographical *Paradox*, by Mr. *Richard Gibbons.*

There are two Places that bear due Eaſt and Weſt from *Plymouth* Fort; yet the neareſt Diſtance, from the one to the other, lies directly North and South.

3. A Paradoxical Problem by Mr. *W. Bamfield.*

Fam'd *Artiſts*, how may I diſpoſe
Of Nineteen Trees in juſt Nine Rows;
Five Trees in each, I would have planted;
Which being done, my Suit is granted.

We are ſorry to diſcover a Diſpoſition, in ſome of our *Correſpondents*, to take more Pleaſure in detecting *imaginary* Faults, than in approving of *real* Merit. We are far from looking upon every Piece printed in our Collection, as the moſt finiſhed of it's Kind: But in a Work like *this*, profeſſedly calculated to exerciſe the Genius of the *Fair Sex* (who are more candid, and leſs prejudiced than thoſe grumbling *Malecontents*,) ſome Indulgences, *we thought*, might have been allowed of.—We could not have imagined, that Perſons whoſe own Labours could not ſee the Light, but under the Favour of ſuch an *Indulgence*, would have been the Firſt, and the moſt ſevere, to cenſure the Exerciſe of *it* in the Behalf of Others. But, tho' our Judgment may ſuffer in the Opinion of theſe Men, Nothing can induce us to depart from that Regard which we profeſs to pay to Riſing Merit, and to the Productions of our Fair Contributors.—Yet, however great our Deſire may be to oblige; and tho' our *Plan* permits us to gratify that Deſire, in a large Extent, by giving Place to many Things that could not be allowed of, were Regard to be only had to the moſt diſtinguiſhed Claſs of Readers; there is, nevertheleſs, a certain Standard, below which we cannot poſſibly carry our Condeſcenſion, conſiſtently either with the Reputation of the *Diary*, or with the Obligations we owe to our able and experienced Correſpondents; who ought not to be made to bluſh for the Company that is given them.

As to the *Rebuſes* printed in the Courſe of this Work (which an *imaginary* Lady has cenſured, in a Manner *too* expreſſive of ſuperior *Taſte* and *Underſtanding*,) it may be affirmed, That *they*, in general, ſeem to pleaſe: and therefore, as they furniſh us with an Opportunity to gratify a great many Correſpondents, at the Expence of a very little Room, we cannot think them improper, as a Part of our Collection.

⁂ *All Contributors to the Diary are deſired to ſend their Letters (Poſt paid) before the Beginning of* MAY, *directed to the Author at Mr.* RICHARD HETT'*s, at Stationer's Hall,* LONDON.

ANSWERS to the MATHEMATICAL QUESTIONS propoſed in the laſt Year's DIARY.

I. Queſtion 448, anſwered by Mr. G. *Witchell.*

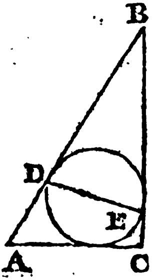
Ah! *Richard*, take a Friend's Advice,
Or you'll be ruin'd in a Trice,
Don't wed the artful *Fair*;
When She ſays *Aye*, do you ſay *No*:
Believe me, ev'ry Scene of Woe
Attend the ill-match'd Pair.

Her Head is turn'd with *Algebra*;
She will not riſe before 'tis Day,
Nor trudge to milk your Kine:
But, if no Reaſon can perſuade
You to refuſe the yielding Maid,
Behold your *Quarantine* *.

* The firſt Equation being multiplied by 6, and compared with the Second, there reſults $yy+\frac{xy}{2}=3xx$; whence, by compleating the Square, $y=\sqrt{3x^2+\frac{x^2}{16}}-\frac{x}{4}=\frac{3x}{2}$; which Value, ſubſtituted in the firſt Equation, gives $\frac{13xx}{4}+\frac{17x}{2}=968$, whence $x=16$ Months, and $y=24$ Days.

In this Manner the Solution is alſo given, by Mr. T. Barker, Mr. E. Batten, Mr. Ja. Bereſford, Bircboverenſis, Mr. Turner Boſton. Mr. J. Buddles, Mr. R. Butler, Mr. W. Fowler, Mr. P. George, Mr. Nath. Gerrad, Mr. R. Gibbons, Mr. J. Hampſon, Mr. Joſ. Harrington, Mr. G. Hicks, Mr. Abr. Horſfall, Mr. E. Houſton, Mr. Steph. King, Mr. W. Kingſton, Mr. W. Litſon, Mr. R. Mallock, Mr. Chr. Meſhan, Mr. J. Milbourn, Mr. Alex. Rowe, Mr. Joſ. Ruſton, Mr. W. Spicer, Mr. W. Stoker, Mr. W. Toms, Mr. Joſ. Waſtell, and ſeveral Others.

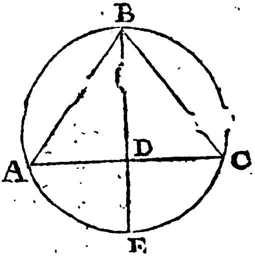
II. Queſtion 449, anſwered by Mr. *Tho. Barker*, of *Weſthall, Suffolk.*



Put $\frac{1}{2}$ the Sum of the two Legs $=x$, and $\frac{1}{2}$ their Difference $=a$; then $x-a=$ AC, $x+a=$ BC, and conſequently $\sqrt{2xx+2aa}=$ AB; alſo, by a well known Theorem, $2x-\sqrt{2xx+2aa}$ (= AC + BC — AB) = DE the Circle's Diameter; whence it's Periphery (putting $n=3.1416$) will be $=2nx-n\sqrt{2xx+2aa}$; the Double of which (by another well known Theorem, and the Conditions of the Queſtion) muſt be equal to the Perimeter of the Triangle, that is, $4nx-2n\sqrt{2xx+2aa}=2x+\sqrt{2xx+2aa}$; whence x is found $=a\sqrt{\frac{\overline{2n+1}|^2}{2\times\overline{2n-1}|^2-\overline{2n+1}|^2}}=13.1$; therefore AC = 10.1, BC = 16.1, AB = 19, and DE = 7.19.

Thus (or in a Manner very little different) the Anſwer is alſo given by Mr. T. Allen, Mr. E. Batten, Mr. T. Baxtonden, Birchoverenſis, Mr. R. Butler, Mr. G. Brown, Mr. W. Chapman, Mr. Chr. Cave, Mr. Tim. Drury, Mr. P. George, Mr. Nath. Gerrad, Mr. R. Gibbons, Mr. J. Goodhead, Mr. T. Harris, Mr. J. Hampſon, Mr. Abr. Horſfall, Mr. R. Mallock, Mr. Chr. Meſhan, Penovius, Mr. W. Spicer, Mr. Abr. Stone, Mr. W. Stoker, Mr. Joſ. Waſtell, Mr. G. Witchell, and ſome Others.

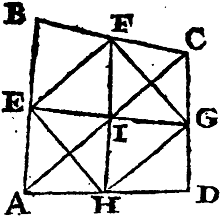
III. Queſtion 450 anſwered.



Put the Content of the Cone ($=133333\frac{1}{3}$) $= c$, and it's Altitude BD $= x$, alſo put $p = 3.1416$, and let $a =$ Diameter (BE) of a Circle deſcribed about BAC; which (by the Laws of Deſcent of heavy Bodies) is given $= 100\frac{2c}{48} =$ the perp. Deſcent in the given Time in which the Chord BA is deſcribed. Now, by the Property of the Circle, AD^2 ($= BD \times ED$) $= x \times \overline{a-x}$; and conſequently $p \times \overline{AD^2} \times \frac{1}{3}BD = \frac{1}{3}px^2 \times \overline{a-x} = c$ (= the Cone's Content:) From which Equation $x = 81.219$, or $x = 50.408$.

Thus the Problem is reſolved by Mr. W. Bamfield, Mr. T. Barker, Mr. T. Baxtonden, Birchoverenſis, Mr. Turner Boſton, Mr. G. Brown, Mr. J. Buddles, Mr. R. Butler, Mr. W. Chapman, Mr. Chriſ. Cave, Mr. W. Davies, Mr. Tim. Drury, Mr. P. George, Mr. Ja. Giles, Mr. R. Gibbons, Mr J. Goodhead, Mr. T. Harris, Mr. Abr. Horſfall, Mr. Steph. King, Mr. W. Kingſton, Mr. W. Litſon, Mr. R. Mallock, Mr. J. Millbourn, Penovius, Mr. Alex. Rowe, Mr. Joſ. Ruſton, Mr. W. Spicer, Mr. Abr. Stone, Mr. W. Toms, and Mr. G. Witchell.

IV. Queſtion 451 anſwered.



Let the biſecting Points be joined by the Lines EF, FG, GH and HE, and let AC be drawn: Then, becauſe the Sides of the Triangles ABC and ADC are divided proportionally, both EF and HG will be parallel to AC (*Euc.* 2. 6;) and, therefore, parallel to each other; and in the very ſame Manner is EH parallel to FG; and ſo, the Triangles EIF and HIG being equiangular (*Euc.* 29. 1) and EF being = HG, thence will EI = GI, and FI = FH.

Q. E. D.

In this Manner the Demonſtration is given by Meſſrs. Allen, Barker, Baxtonden, Butler, Brown, Davies, George, Goodhead, Mallock, Milbourn, Penovius, Spicer, Wildbore and Witchell; to none of whom, in particular, we have a Right to aſcribe the Solution above exhibited, in Preference to the Others.

V. QUESTION 452 *anſwered.*

PUT .7854 $= p$; the Content of the Buſhel, in Cubic Inches, $= a$; and the internal Diameter $= x$; then will the Area of the Baſe $= px^2$, the Circumference of the Baſe $= 4px$, the Depth of the Buſhel $= \frac{a}{pxx}$, the Concave Surface $= 4px \times \frac{a}{pxx} = \frac{4a}{x}$, and the whole internal Surface (including the Baſe) $= \frac{4a}{x} + px^2$; Which being a *Minimum* (by the Queſtion) we thence have $-\frac{4a\dot{x}}{xx} + 2px\dot{x} = 0$; whence $x = \overline{\frac{2a}{p}}\Big|^{\frac{1}{3}} = 18.1604$; and the Depth $\left(\frac{a}{pxx} = \frac{x}{2}\right) = 9.0802$. Hence 158.85 = the Quantity of the Metal; which, at 16 Pence per Pound (ſuppoſing a Cubic Foot of Hammer'd Braſs to weigh 8349 Ounces, as by the Tab. in *Miſ. Cur.*) comes to 3 *l.* 3 *s.* 11 *d.*

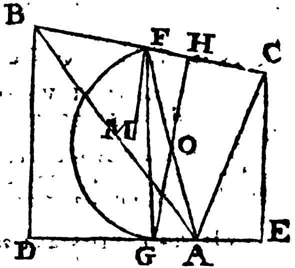
Thus *the Solution is given by Meſſrs. Barker, Beresford, Burchoverenſis, Boſton, Buddles, Chapman, Drury, Haſtings, Gibbons, Giles, Goodhead, Harris, Hicks, Horſfall, Houlſton, King, Kingſton, Rowe, Toms, and ſome Others.*

The ſame anſwered otherwiſe.

LET x and y denote the internal Diameter and Depth, and a the Thickneſs of the Metal; then the external Diameter and Depth being $x + 2a$ and $y + a$, we ſhall have $pyx^2 = c$ (= the given Content) and $p \times \overline{y+a} \times \overline{x+2a}\big|^2 - c$, a *Minimum* (by the Queſtion): Whence, in Fluxions, $\dot{y}x^2 + 2yx\dot{x} = 0$, and $\dot{y} \times \overline{x+2a}\big|^2 + \overline{y+a} \times \overline{x+2a} \times 2\dot{x} = 0$; hence $\dot{y} = -\frac{2y\dot{x}}{x} = -\frac{\overline{y+a} \times 2\dot{x}}{x+2a}$, $\frac{y}{x} = \frac{y+a}{x+2a}$, and $x = 2y$: Whence alſo $\frac{1}{2}px^3$ $(= px^2y) = c$; from which x is given $= \overline{\frac{2c}{p}}\Big|^{\frac{1}{3}} = 18.1604$, and $y = 9.0802$: hence the Quantity of Metal $(= p \times \overline{y+a} \times \overline{x+2a}\big|^2 - p \times yx^2 = 4pa \times \overline{3yy + 3ay + aa})$ comes out $= 158.85$ Cubic Inches, and the Value thereof 3 *l.* 3 *s.* 11 *d.*

Thus the Problem is reſolved by Mr. *T. Baxtondell,* Mr. *R. Butler,* Mr. *W. Davies,* Mr. *R. Mallock, Philarithmus, Penovius, P. M.* Mr. *W. Spicer, and* Mr. *G. Witchell.——From this laſt Method it appears, that, let the Thickneſs of the Metal be ever ſo great, the external Diameter and Depth, (as well as the internal) will be, accurately, in the Ratio of Two to One.*

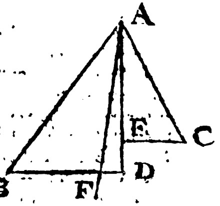
VI. QUESTION 453 *anſwered by Mr.* Thomas Moſs.



LET BC, joining the Extremes of the given Lines AB and AC, be biſected by AF; upon which conceive a Semicircle FGA to be deſcribed, and conceive FG to be perpendicular to ED, and GH to BC: Then it is evident, that DE × FG, or BC × GH will be = the Area BCED; which (as BAC is given) muſt be a *Maximum* (by the Queſtion), and therefore GH (as BC is invariable) muſt alſo be a *Maximum*; and this, ſince G is always in the Circumference of the Circle, muſt neceſſarily happen when HG paſſes thro' the Center O; in which Caſe, the Angle OFG = ½ FOH = ½ OFM (FM being ſuppoſed perpendicular to BC): Whence this *Conſtruction.* Having joined A, F, and made FM perpendicular to BC, draw FG to biſect the Angle AFM; then, thro' A, draw DE perpendicular to FG, and the Thing is done.——The Numerical Calculation is, from hence, very eaſy; whence the Angle DAB comes out = 54° : 24′ ½, and the Sum of the two Triangles (ABD + ACE) = 131.53.

P. M. (of Durham) *has alſo favoured us with a very neat Geometrical Conſtruction of this Problem, which does not eſſentially differ from that above exhibited.*

An Algebraical Solution to the ſame, by Philarithmus.

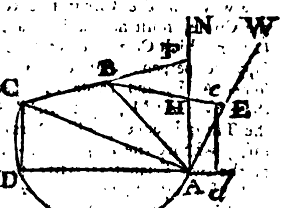


LET AD be the Line ſought, and let AF biſect the given Angle BAC; call 2BAF (60°) A; 2FAD, V; Tab. Rad. 1; AB (20), a; AC (24), b; S, A, s; Coſ. A, c; S, V, x; Coſ. V, y; then by Trig. $\frac{2BD \times DA}{a^2} =$ S. 2BAD (or S, $\overline{A+V}$) $= sy + cx$, and $\frac{2CE \times EA}{b^2} =$ S. 2CAE (or S, $\overline{A-V}$) $= sy - cx$; therefore $\frac{BD \times DA}{2}$, or the Triangle ABD $= \overline{sy+cx} \times \frac{a^2}{4}$, and $\frac{CE \times EA}{2}$, or the Triangle ACE $= \overline{sy-cx} \times \frac{b^2}{4}$, and their Sum $= sy \times \frac{a^2+b^2}{4} + cx \times \frac{a^2-b^2}{4}$, a *Minimum*; therefore $s\dot{y} \times \overline{a^2+b^2} + c\dot{x} \times$

$\overline{a^2 - b^2} = 0$; whence, ſubſtituting $-\frac{x\dot{x}}{y}$ for $\dot{y}$, and dividing by $s\dot{x}$, and tranſpoſing, $\frac{x}{y} \times \overline{a^2 + b^2} = \frac{c}{s} \times \overline{a^2 - b^2}$; or $a^2 + b^2 : a^2 - b^2 ::$ Cot. A : T. V; whence V is given = 11°: 16′.7, and FAD, its half, = 5°: 35′: 35″, and the greateſt Sum of the Triangles, 131.532.

Thus (or in a Manner very little different) the Anſwer is alſo given by Meſſrs. *Barker, Baxſonden, Birchoverenſis, Brown, Butler, Davies, Fowler, George, Kingſton, Penovius, Spicer and Witchell.*

VII. QUESTION 454 *anſwered by Mr.* O'Cavanah.



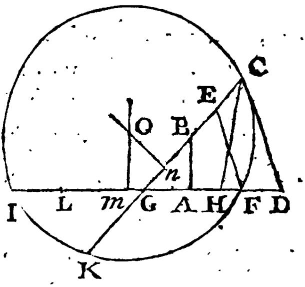
DRAW AB and BC equal to the two given Diſtances (60 and 45), ſo that the Supplement (ABF) of the Angle contained by them, ſhall be equal to (45°) double the given Angle included between Wind and the Meridian; join AC, and let a Semicircle be deſcribed thereon, in which apply CD (= 40) = the given Difference of Latitudes; draw AN parallel thereto; then, if NAW be made = 22°: 30′, I ſay that BAW will be the Angle ſought, which the Ship makes with the Wind.

For, having produced CB to meet AN in F, let BHcE be ſo drawn, as to make the Angle BHA = BCD = BFN, in which take *Bc* = BC, and let *cd* be parallel (and conſequently equal) to CD; then, AB, B*c*, and *cd*, being (by Conſtruction) equal to the three Quantities given, it only remains to prove, that the Angle BBA, which the Ship makes with the Wind, on her ſecond Courſe (B*c*), is equal to the Angle BAE, on her firſt Courſe (AB). Now *(by Conſtruction)* BFN = BHA; but BFN — FBA (2NAW) = BAH; whence BFN — NAW = BAE: But BHA (BFN) — NAW = BEA; therefore BAE = BEA.

Calculation. In the Triangle ABC we have given AB (= 60), BC (= 45), and the Angle ABC (= 135°), to find BAC (= 19°: 7′), and AC (= 97.178); from which laſt, and CD (= 40), CAD is found = 24°: 18′: Whence BAD = 43°: 25′, and BAW = 69°: 5′.

Mr. *W. Davies, and* Mr. *Tho. Moſs have likewiſe conſtructed this Problem: And ſeveral very neat algebraical Solutions to it, have been received, from* Mr. *T. Allen,* Mr. *T. Baxſonden,* Mr. *Geo. Brown,* Mr. *W Kingſton,* Mr. *W. Spicer,* Mr. *W. Stoker,* Mr. *G. Witchell, and Others; which, for want of Room, we are obliged to omit.*

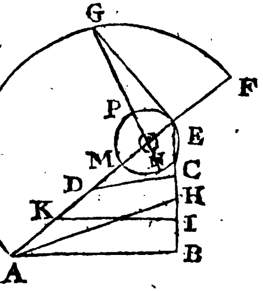
VIII. QUESTION 455 *anſwered by* P. M. *of* Durham.



FROM the Angle C draw CH to biſect the given Trapezium ABCD (p. 4. 6. *Simſ. Elem. Geom.*); produce BC, AD indefinitely, cutting each other in G, from which Point, on CG produced, take GK equal to GH, and, on DG produced, take GL equal to GB; draw two Right-lines biſecting BG, LA perpendicularly in *n* and *m*, and interſecting each other in O; round which Point O as a Center, with the Diſtance OC or OK, deſcribe a Circle cutting AD (produced both Ways if needful) in F and I; from G take GE equal to GI; join E, F, and the Thing is done.

Demon. *m*L and *m*A are equal (by Hypoth.) and alſo *m*I, and *m*F (3. E. 3.); therefore the Remainders IL, AF will be equal; but ſince GE, GI, and GB, GL are equal (by Hypoth.) IL, BE, and conſequently AF, BE will be equal. But I ſay moreover, that EF biſects the Trapezium, for CG : GF :: GE (GI) : GH (GK) (35. E. 3.) therefore the Triangles CGH, EGF are equal (15. E. 6.) and, taking away the common Triangle AGB, there will remain the Quadrilateral BH = BF; therefore, becauſe CH biſects the given Trapezium BD (by Hypoth.) EF will biſect it alſo. *Q. E. D.*

The ſame conſtructed otherwiſe, by Mr. W. Davies.

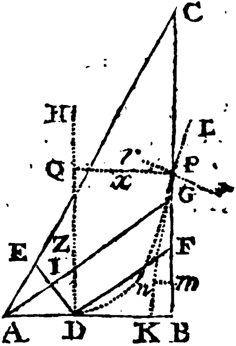


DRAW AH ſo as to make the Triangle ABH equal to half the given Trapezium ABCD (p. 4. 6. of *Simſ. Geom.*); produce AD and BC to meet in E, and, in the former of them, take AM = EB, and EF = EH; then take EG a Mean-proportional between AE and EF; and from G, to the Middle of EM, draw GO; make OK = OG, BI = AK, and draw KI, which will divide the given Trapezium ABCD into two equal Parts.

For, if GO be conceived to cut, in P and N, a Circle deſcribed on the Diameter ME, then will KE × KM (= GN × GP) = GE^2 (*Eu.* 36. 3.) = AE × EF = AE × EH; but, becauſe AM = EB, and AK = BI, thence is KM = BI; therefore KE × EI (= KE × KM) = AE × EH; and ſo, the Triangle EKI being = EAH (*Eu.* 15. 6.), the Trapezium ABIK is alſo = ABH = ½ ABCD. *Q. E. D.*

In the two Solutions here exhibited, it will be obſerved, that the Authors have conſidered different Caſes: For, of the two equal Trapeziums, into which the given one is to be divided, the oppoſite Sides of either the one, or the other, may, by the Queſtion, be taken as equal; according as the Interſection of the other oppoſite Sides is ſuppoſed to fall above or below the Baſe.

IX. QUESTION 456 *anſwered by Mr.* H. Watſon.

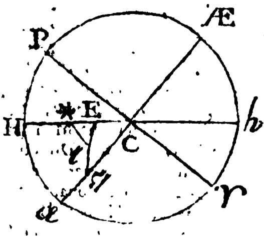


LET ABC repreſent the Field, and D, E, F the Places of the Trees; and let AIG be parallel to DF: Then AIE being = EDF = a Right-Angle, EAI (or CAG) is (= Comp. AEI = Comp. EAD) = C; whence CG = AG, and BC = BG + AG. From which, as many Points as you pleaſe, in the Curve bounding the Perpendicular (BC) may be determined.

But to determine the leaſt Value of BC (calling BF a, and DB x) we have DB (x) : BF + DF $(a+\sqrt{aa+xx}$ :: AB $(a+x)$: BG + AG (= BC) $= \frac{\overline{a+\sqrt{aa+xx}}\times\overline{a+x}}{x}$. Whence, by taking the Fluxion, &c. $x^4 = 2a^3x + a^4$. To conſtruct this Equation, put $az = x^2$, and let the Parabola DPL anſwering to $az = x^2$ be deſcribed, having its Axis DH perpendicular to AD; then if there be taken DK = a, Kn (parallel to DH) = ½a, and from the Center n, with the Radius $\frac{3a}{2}$, an Arch rPr of a Circle be deſcribed cutting the Parabola in P; the Perpendicular ſought will paſs thro' this Point P; and, if in the Perpendicular, ſo drawn, there be taken BF = AD, and the Length of AG (parallel to DF) be ſet off from G to C, then ſhall ABC (when AC is drawn) be the Triangle required to be conſtructed.

Mr. *M'Roy* (the Propoſer) *has alſo given an elegant Solution of this Problem, with ſome very ingenious Obſervations thereon; the whole of which (tho' very maſterly) is rather too long, for our ſcanty Limits, to be given here.*——Mr. *O'Cavanah,* Mr. *Rollinſon and* Mr. *Witchell have alſo conſtructed this Problem; and ſeveral Correſpondents have gone thro' Part of the Solution.*

X. QUESTION 457 *anſwered by* Philarithmus.

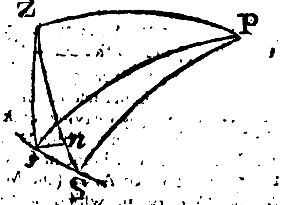


LET E be the Point of the Ecliptic oppoſite to the Sun's Center, and riſing with Arcturus; ✱ *l* an Arc of the Circle of Longitude paſſing thro' the Star; then (by carrying back the Perihelion) the Sun's Diſtance from the Winter Solſticial Point in 60 Days, about the Year 850 A. C. (the Middle of the Century in which *Heſiod* is uſually placed) will be 60° : 10′; whence aſſuming ♎ E (= its Complement) 29° : 50′, in the Triangle ♎ EC there are alſo given the Angles at ♎ and C, whence ♎ EC is given (= 109° : 12); therefore in the Triangle ✱ *l* E the Angle at E being given, and ✱ *l* (= Arcturus's Latitude), E *l* is found = 12° : 3, and ♎ *l* = 17° : 47′, which, added to 19° ; 53′ : 52″, gives the Preceſſion of the Equinox from *Heſiod*'s Time to 1690, equal to 37° : 30′ : 52″, anſwering to the Year 997 A. C. or rather 1002 A. C.

But the Arc ♎ E ought to be ſhortened at leaſt 1° for the Refractions of the Sun and Arcturus, and the Sun's Semidiameter; now 1° in the Arc ♎ E (or an Error of a Day in *Heſiod*'s Account) leſſens the Arc ♎ *l*, 50′, and conſ. the Time 60 Years. So that Arcturus's Image was in the Horizon 60 Days after the Winter Solſtice, juſt when the Sun diſappeared about the Year 940 A. C. But how far the Data are to be depended upon as accurate, I am not able to ſay, conſidering that *Heſiod* lived before Aſtronomy was cultivated among the *Greeks* as a Science, and theſe Obſervations of the Stars were uſed to mark the Returns of the Seaſons in the Room of an artificial Year, which they wanted. There is one Thing indeed might be alledged in Favour of thoſe who place him rather later than earlier, that ſuppoſing the Obſervations made with all the Accuracy they were capable of at firſt, yet it might have been done before *Heſiod*'s Time, and retained for the Sake of a round Number, whilſt its Deviations from Truth were not very great, or the Cauſe of the Alteration known.

Mr. *G. Witchell*, the Propoſer of this Queſtion, proceeds in the Solution of it exactly in the ſame Manner. He makes the Year ſought to be *Ant. Chr.* 1007: Which he thinks is near a Century and Half earlier than the Truth; but obſerves, that, if the Sun had been ſet about 8^{h} ½ before the Appearing of the Star, the Reſult would give *Ann. ant. Chr.* 870, as Sir *Iſaac Newton* has it in his Chronology. Hence he infers, that *Chronologers* ought not to lay any great Streſs, or too much reſt their Syſtems on ſuch Obſervations as theſe.

XI. QUESTION 458 *anſwered by Mr.* G. Witchell.

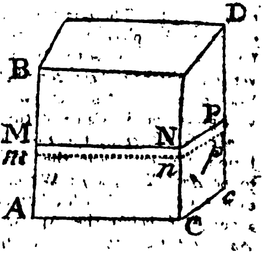


LET P repreſent the North Pole, Z the Zenith, and S *s* a very ſmall Part of the Sun's Parallel of Declination deſcribed in a given Particle of Time; ſuppoſing PS, P*s*, ZS, Z*s* to be drawn, and alſo *sn* perpendicular to ZS. It is evident, that the Celerity with which the Man (walking uniformly in the Direction of his own Shadow) leaves the Meridian, is always proportional to the Sine of the Sun's Azimuth PZS; but the Sine of PZS is to the Sine of PSZ (or S*sn*) in the conſtant Ratio of the Sine of PS to the Sine of PZ: And the Sine of S*sn* is, again, to S*n* (the Increaſe of the Sun's Altitude) in the given Ratio of the Sine S*ns* to S*s*. Therefore the Celerity aforeſaid is every-where, in a conſtant Ratio to that with which the Sun's Altitude increaſes; And conſequently the whole Increaſe of the Sun's Altitude, from Six, to 50 min. after 10 o'Clock (found by Calculation to be 37° 27′) muſt be to 12 m. (the whole of the Man's Weſting during that Time) in that ſame conſtant Proportion. But the Increaſe of the Sun's Altitude when due Eaſt (at which Time the Man leaves the Meridian with his abſolute Motion) is at the Rate of 8° 53′ $\frac{1}{4}$ *per* Hour, or at the Rate of 42° 57′ in 4 h. : 50′ (the whole Time of Walking); Therefore it will be, as 37° 27′ : 42° 57′ :: 12 Miles : 13.76 = whole Diſtance travelled; being at the Rate of 2.85 Miles *per* Hour. *Q. E. I.*

Thus alſo (without the leaſt Variation in Principle) the Solution is given by Meſſrs. O'Cavanah, Philarithmus, Rollinſon *and* Wildbore.

XII. QUESTION 459 *anſwered by Mr.* Hugh Brown.

(*the Propoſer*).



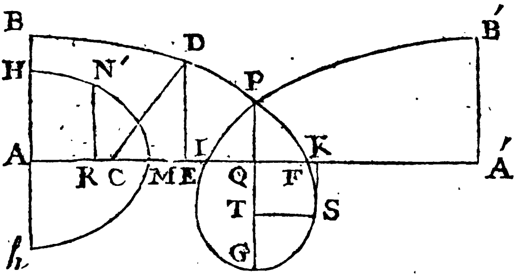
PUT *a* = the Depth (AB) of the Ciſtern, and *b* = 190.638 = the Content, in Ale Gallons: Then, denoting the three given Quantities 2, 5, and 150 by *m*, *n* and *p*; and calling AM, *x*; M*m*, $-\dot{x}$, and the Time of the Deſcent thro'. BM, *t*; we ſhall have $n\sqrt{\frac{x}{a}}$ = the Rate (*per* Min.) at which the Water runs out; and conſequently $n\sqrt{\frac{x}{a}} - m$ = the Rate of the real Decreaſe. Hence, as

$1 : \dot{t} :: n\sqrt{\frac{x}{a}-m} : -\frac{b\dot{x}}{a}$ (= the Decreaſe [illegible] P pnm, in the Time t); whence $\dot{t} = -\frac{\dot{x}}{a}\times\frac{b}{n\sqrt{\frac{x}{a}-m}}$: Alſo (by the Queſtion) we have $t + b\times\frac{a-x}{a} = p$. But to find the Value of t from theſe Equations, let y be aſſumed $=\frac{n\sqrt{\frac{x}{a}-m}}{n-m}$ (=the Ratio of the Decreaſe at M to that at B) ſo ſhall $\frac{x}{a} = \frac{\overline{\overline{n-m}\times y+m}^{\,2}}{nn}$, and $\dot{t} = -\frac{2b}{nn}\times\overline{\overline{n-m}\cdot\dot{y}+\frac{m\dot{y}}{y}}$; and conſequently $t = \frac{2b}{nn}\times\overline{\overline{n-m}\times\overline{1-y}-m\times\text{H Log.}\,y}$. But, by the other Equation, t is $=\frac{p}{m}-\frac{b}{m}+\frac{b}{m}\times\frac{\overline{\overline{n-m}\times y+m}^{\,2}}{nn}$: Which two Values being compared together, we get $\overline{\frac{n}{m}-1}\times 2y+\overline{\frac{n}{m}-1}^{\,2}\times\frac{yy}{2}+\text{H Log.}\,y=\overline{\frac{n}{m}-1}\times\overline{\frac{n}{2m}+\frac{3}{2}}-\frac{n^2p}{2m^2b}$: Which, in the preſent Caſe, becomes $3y+\frac{9yy}{8}+\text{H. Log.}\,y = 1.666$; whence y is found $= .5954$; and from thence $t = 34.33 = 34$ min. : 20 ſec. the Time required.

In a Manner very little different, this Problem is alſo anſwered by Mr. G. Brown, *Mr.* R. Butler, Philarithmus, *and Mr.* Cha. Wildbore; *whoſe Solutions are equally conciſe and elegant.*

XIII. QUESTION 460 *anſwered by Mr.* O'Cavanah,
of Dublin.

LET BDPFGIPB′ be the required Curve, deſcribed (in a whole Revolution) by the Body D moving uniformly therein, whilſt the other propoſed Body C moves uniformly over the Right-line AA′: Conceive CD, and alſo the Ordinate DE, to be drawn; putting CD (= AB) $= a$, CE $= z$, AC $= x$, AE $= y$, and the given Ratio of BD to AC, as n to 1. Then will DE $=\sqrt{aa-zz}$, AE $= x+z$,



and BD $= nx$; whereof the Fluxions being $-\frac{-z\dot{z}}{\sqrt{aa-zz}}$, $\dot{x}+\dot{z}$, and $n\dot{x}$, we therefore have $\frac{z^2\dot{z}^2}{aa-zz}+\overline{\dot{x}+\dot{z}}^2=n^2\dot{x}^2$; whence $\dot{x}=\frac{\dot{z}}{nn-1}+\frac{\dot{z}\sqrt{n^2a^2-z^2}}{\overline{nn-1}\times\sqrt{aa-zz}}$, and $\dot{y}$ $(=\dot{x}+\dot{z})=\frac{n^2\dot{z}}{nn-1}+\frac{\dot{z}\sqrt{n^2a^2-z^2}}{\overline{nn-1}\times\sqrt{aa-zz}}$. To aſſign the Fluent hereof, let HMb be a Semi-ellipſis, having its greater Semi-axis AM $=$ AB, and its leſſer (AH) in Proportion thereto, as $\sqrt{nn-1}$ is to n; then take AR $= z$ $(=$ CE$)$ and make RN parallel to AB; ſo ſhall the Arch HN $=$ Fluent of $\frac{\dot{z}\sqrt{n^2a^2-zz}}{n\sqrt{a^2-z^2}}$; and we ſhall therefore have $y=\frac{n^2\times \mathrm{AR}+n\times \mathrm{HN}}{nn-1}$; whence the Ordinate DE is alſo known.

Cor. I. When z becomes $=a$, then y is $=$ AF $=\frac{n^2\times \mathrm{AM}+n\times \mathrm{HNM}b}{nn-1}$. But, when the two Bodies are arrived at Q and G, and z is (again) $=o$, then $y=$ AQ $=\frac{n\times \mathrm{HM}b}{nn-1}$; whence QF $(=$ AF $-$ AQ$)$ is given $=\frac{n^2\times \mathrm{AM}-n\times \mathrm{HM}}{nn-1}$.

Cor. II. If $\dot{y}$ $\left(=\frac{n^2\dot{z}}{nn-1}+\frac{\dot{z}\sqrt{n^2a^2-zz}}{\overline{nn-1}\times\sqrt{aa-zz}}\right)$ be taken $=o$, then will $z=\frac{na}{\sqrt{nn+1}}$; and the Ordinate (KS) which touches the Curve in (S) will be $= \frac{a}{\sqrt{nn+1}}$ $(= \sqrt{1-zz})$. And if the Value of y correſponding hereunto be found (by the general Equation) and from it AQ be ſubtracted, we ſhall thence get the Semi-breadth QK (or ST) of the *Nodus* PSGIP.—As to the Value of PQ it may be alſo obtained from the ſame Equation, by which $\frac{n^2 \times AR + n \times HN}{nn-1}$ $(= y)$ is given $= \frac{n \times HMb}{nn-1}$ (= AQ): Where, if the Value of n be ſuch, that AR = AM, then will $n \times$ AM = HM, or $n : 1 :: HM : AM$; in which Caſe the Interſection P will fall in the Line AA′: But if the Value of n be leſs than that determinable from hence (but ſtill greater than Unity) the Point P will then fall below the Line AA′, but never by a Diſtance greater than $\frac{2884}{10000} \times AB$; nor can ST be ever leſs than $\frac{266}{1000} \times AB$.

When n is ſuppoſed leſs than Unity, the radical Quantity $\sqrt{n^2a^2 - z^2}$ will be no longer poſſible than till z becomes $= na$; after which Time the Conditions of the Problem can no longer be fulfilled.

Mr. Tho. Allen, *Mr.* E. Rollinſon *(the Propoſer)*, Peter Walton, *Mr.* Cha. Wildbore, *and* Philarithmus, *have alſo favoured us with very elegant Solutions to this Problem.. The laſt of theſe Gentlemen (who is a new Correſpondent, and whoſe Judgment and Accuracy we greatly approve) has to his Solution ſubjoined ſome curious Obſervations, differing very little from thoſe above exhibited.*

XIV. QUESTION 461 *anſwered by (the Propoſer)* P. Walton.

$\frac{\dot{x}}{\sqrt{1-x^4}}$ being $= \frac{\dot{x}}{\sqrt{1-x^2} \times \sqrt{1+x^2}} = \frac{\dot{x}}{\sqrt{1-x^2}} \times \overline{1 - \frac{1}{2}x^2 + \frac{1.3}{2.4}x^4 - \frac{.3.5}{2\ 4.6}x^6 + \&c.}$ it appears, by Art. 286 of Mr. *Simpſon*'s Fluxions, that the whole Fluent of $\frac{\dot{x}}{\sqrt{1-x^4}}$ is $= f \times \overline{1 - \frac{1^2}{2^2} + \frac{1^2.3}{2^2.4^2} - \frac{1^2.3^2.5^2}{2^2.4^2.6^2} + \&c.}$ f being the whole Fluent of $\frac{\dot{x}}{\sqrt{1-x^2}}$; which, it is well known, is $\frac{1}{4}$ of the Periphery of a Circle whoſe Radius is 1.

Now, if x be ſuppoſed $= y^{\frac{1}{2}}$, $\frac{\dot{x}}{\sqrt{1-x^4}}$ will be $= \frac{\frac{1}{2}y^{-\frac{1}{2}}\dot{y}}{\sqrt{1-y^2}}$ of which Fluxion (by *Landen*'s Math. Lucubrations, page 146) the whole Fluent is $\frac{e+\sqrt{e^2-2f}}{2}$, e denoting $\frac{1}{4}$ of the Periphery of an Ellipſis, whoſe Semi-axes are $\sqrt{2}$ and 1.

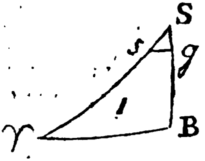
It follows therefore, that the Series $1-\frac{1^2}{2^2}+\frac{1^2.3^2}{2^2.4^2}-\frac{1^2.3^2.5^2}{2^2.4^2.6^2}$ + &c. is $=\frac{e+\sqrt{e^2-2f}}{2f}$.

The ſame anſwered by Mr. E. Rollinſon.

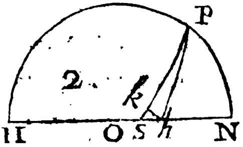
IT is well known that $Q\times\overline{1-\frac{1}{2}e+\frac{1.3}{2.4}f-\frac{1.3.5}{2.4.6}g+\&c.}$ is the Fluent of $\frac{\dot{x}}{\sqrt{1-x^2}}\times\overline{1-ex^2+fx^4-gx^6+\&c.}$ when $x=1$; Q being the Fluent of the firſt Term, and equal to $\frac{1}{4}$ of the Periphery of the Circle whoſe Radius is Unity. Hence, if e be taken $=\frac{1}{2}$, $f=\frac{1.3}{2.4}$, $g=\frac{1.3.5}{2.4.6}$ &c. then $Q\times\overline{1-\frac{1^2}{2^2}+\frac{1^2.3^2}{2^2.4^2}-\frac{1^2.3^2.5^2}{2^2.4^2.6^2}+\&c.}=$ Flu. $\frac{\dot{x}}{\sqrt{1-xx}}\times\overline{1-\frac{1}{2}x+\frac{1.3}{2.4}x^2\ \&c.}$ $=$ Flu. $\frac{\dot{x}}{\sqrt{1-xx}}\times\overline{1+xx}|^{-\frac{1}{2}}=$ Flu. $\frac{\dot{x}}{\sqrt{1-x^4}}$; and conſequently $1-\frac{1^2}{2^2}+\frac{1^2.3^2}{2^2.4^2}-\frac{1^2.3^2.5^2}{2^2.4^2.6^2}$ &c. $=\frac{1}{Q}\times$ Fl. $\frac{\dot{x}}{\sqrt{1-x^4}}$ (when $x=1$). But $\frac{\dot{x}}{\sqrt{1-x^4}}+\frac{x^2\dot{x}}{\sqrt{1-x^4}}$ is known to expreſs the Fluxion of an Elliptical Arch (R), whoſe two Semi-axes are 1 and $\sqrt{2}$; and it may be eaſily demonſtrated (by the Method laid down at p. 76. in *Simpſon's Laws of Chance*) that, if A and B be aſſumed to denote the Fluents of $\frac{x^{pn-1}\dot{x}}{\sqrt{1-x^n}}$ and $\frac{x^{pn+\frac{1}{2}n-1}\dot{x}}{\sqrt{1-x^n}}$ (p and n being any poſitive Numbers whatever), the Product AB (of theſe Fluents) will (when $x=1$) be $=\frac{2Q}{pnn}$. Whence, by taking $n=4$, and $p=\frac{1}{4}$, ſo that A and B may become the reſpective Fluents of $\frac{\dot{x}}{\sqrt{1-x^4}}$ and $\frac{x^2\dot{x}}{\sqrt{1-x^4}}$ (whereof the Sum is given above $=$ R) we have AB, in this Caſe, $= \frac{1}{2}Q$: From whence, and the Equation $A + B = R$, A is found $= \frac{R}{2} + \frac{1}{2}\sqrt{R^2 - 2Q}$; and $\frac{A}{Q} = \frac{R}{2Q} + \frac{1}{2}\sqrt{\frac{RR}{QQ} - \frac{2}{Q}}$ = the Series propoſed.

Some Correſpondents have objected againſt this Queſtion, as an unfair one; "becauſe there can be no Reaſoning from the Data, *to arrive at a Concluſion."—We ſhall not take upon us to decide this Point; but ſhall not, however, ſcruple to allow, that Problems of a very abſtracted and intricate Nature, are leſs eligible in a Work like this, than ſome others of a different Kind.*

The PRIZE-QUESTION *anſwered by* Κυβερνήτης.



LET sS repreſent the Increaſe of the Sun's Longitude (♈ s) in the Space of ſix Hours (or $\frac{1}{4}$ of a Day); and let Sg be the Increaſe of Declination correſponding thereto: Putting $s =$ Sin. ♈, $x =$ Sin. ♈ S, and $u =$ sS: Then will $sx =$ Sin. Decl. BS, and $\sqrt{1 - s^2x^2} =$ its Coſine: And ſo, again (*per Spherics*) Tang. ♈ S $\left(\frac{x}{\sqrt{1 - xx}}\right)$: Tang. BS $\left(\frac{sx}{\sqrt{1 - ssxx}}\right)$ :: Rad. : Coſ. S :: sS (u) : $Sg = \frac{su\sqrt{1 - x^2}}{\sqrt{1 - s^2x^2}}$ = the Increaſe of Decl. in $\frac{1}{4}$ of a Day. Therefore, if m be now put for $\frac{1}{4}$ of the whole Periphery of the Circle (the Radius being Unity) and z for the Arch, expreſſing the Sun's Aſcenſional Difference, we ſhall have $m : m + z :: \frac{su\sqrt{1 - x^2}}{\sqrt{1 - s^2x^2}} : \frac{su \times \overline{m + z}\sqrt{1 - xx}}{m\sqrt{1 - s^2x^2}}$ = the Alteration of Decl. from Noon to Sun-Setting. Let this (*in Fig.* 2.) be denoted by Sk (ſuppoſing PS to be the Sun's Polar Diſtance, and S his Place in the Horizon HON, at Setting) and let b, c, and d be taken to expreſs the Sine, Co-ſine, and Tangent of PN the *Pole's* Elevation. Then, the Sine of S being $= \frac{b}{\sqrt{1 - s^2x^2}}$, its Co-ſine will be $= \frac{\sqrt{c^2 - s^2x^2}}{\sqrt{1 - s^2x^2}}$; whence $bk = \frac{b}{\sqrt{c^2 - s^2x^2}}$ $\times$ (Sk);



× (S k); and conſequently Sin. k P b $\left(=\frac{\text{Rad.}}{\text{Sin. PS}}\times(bk)\right)=$

$$\frac{b\times(Sk)}{\sqrt{1-s^2x^2}\times\sqrt{c^2-s^2x^2}}=\frac{bsu\times\overline{m+z}.\sqrt{1-xx}}{m\times\overline{1-ssxx}\times\sqrt{c^2-s^2x^2}}$$

; which, by the Queſtion, is to be a *Maximum*; and conſequently its Log. ($=$ $\text{Log.}\frac{bs}{m}+\text{Log.}u+\text{Log.}\overline{m+z}+\frac{1}{2}\text{Log.}\overline{1-xx}-\text{Log.}\overline{1-s^2x^2}-\frac{1}{2}\text{Log.}\overline{c^2-s^2x^2}$) a *Maximum* alſo: Whence, in Fluxions (putting $t=\frac{s}{c}$) we have

$$\frac{\dot u}{u}+\frac{\dot z}{m+z}-\frac{x\dot x}{1-xx}+\frac{2s^2x\dot x}{1-s^2x^2}+\frac{t^2x\dot x}{1-t^2x^2}=0;$$

but the Sine of z being $\frac{bsx}{c\sqrt{1-s^2x^2}}$, we have $\dot z=$

$$\frac{bs\dot x}{\overline{1-s^2x^2}.\sqrt{c^2-s^2x^2}}=\frac{ds\dot x}{\overline{1-s^2x^2}.\sqrt{1-t^2x^2}}.$$

And, to determine u and $\dot u$ alſo, let e ($=$ .017) denote the Eccentricity of the Earth's Orbit, and y the Sine-Complement of the Sun's (or Earth's) *true Anomaly*: Then $\overline{1-ey}|^2$ (as is well known) will expreſs the *Rate* of the Increaſe of this Anomaly (or of the Sun's true Longitude): Which Quantity being, therefore, proportional to $\dot u$, we have $\frac{\dot u}{u}=\frac{-2e\dot y}{1-ey}$. But the Difference of the two Angles, whoſe Sines are y and x, being given ($=$ 9° : 14′) $=$ the Diſtance of the Aphelion from the Solſtitial Point, we ſhall, by putting the Sin. of 9° : 14′ $=p$, and its Co-ſine $=q$, have $y=qx-p\sqrt{1-xx}$; and conſequently $\frac{\dot u}{u}$

$$\left(=\frac{-2e\dot y}{1-ey}\right)=-\frac{2eq\dot x\sqrt{1-xx}-2epx\dot x}{\sqrt{1-xx}\times\overline{1-eqx+ep\sqrt{1-xx}}}=$$

$-2e\dot x$, very near (becauſe the Terms both in the Numerator and Denominator, after the two firſt, may, on Account of their Smallneſs, be neglected). This Value, therefore, with that of $\dot z$, being ſubſtituted in the general Equation; we, at length, get $-2e+$

$$\frac{ds}{\overline{1-ssxx}\sqrt{1-t^2x^2}\times\overline{m+z}}-\frac{x}{1-xx}+\frac{2ssx}{1-s^2x^2}+\frac{ttx}{1-t^2x^2}$$

$=0$: From whence, (either by reſolving the whole into a *Series*, or by any other of the known Methods of Approximation) the Value of x may be found, and will come out $=$ .493 $=$ Sine of 29° 32′ $=$ Sun's Longitude ſought; anſwering to the 19th Day of *April*; the Afternoon of that Day exceeding the Forenoon by 1′ : 4″ $\frac{3}{4}$.

New

New MATHEMATICAL QUESTIONS *to be anſwered in the next Year's* DIARY.

I. QUESTION 462, *by Miſs* Ann Nicholls.

TWO Partners, in a Venture made,
Gain twice Two Hundred Pounds in Trade:
The Stock of A, when they began,
Exceeded B's by Eighty-One;
Twice Ninety-Five B gain'd in all.
Now for the Stock of both I call.

II. QUESTION 463, *by Miſs* S. T.

A Drover bought in as many Sheep, of different Sorts, as coſt him 48*l.* One-third of which he ſold again at 20*s.* a-piece; One-fourth at 18*s.* and the reſt at 16*s.* a-piece; and found his Gain, upon the whole, to be 5*l.* 10*s.* What Number of Sheep did he buy and ſell?

III. QUESTION 464, *by Mr.* Tho. Harris.

NEAR Ouſe's verdant Banks in Bedfordſhire,
Stands Carlton, bleſt with a ſagacious Fair,
In whom at once Minerva's Wit is ſeen,
Diana's Chaſteneſs, and the Graces' Mien.
Would you the Name of this fair Charmer know,
Firſt ſolve th' Equations which you'll find below *.

* $x + y + z + v = 56$, $x^2 + y^2 + z^2 + v^2 = 910$, $xv + 2y_2 - z^2 = 6$, $z = 2y$; in which the Values of x, y, z and v denote the Places in the Alphabet of the four Letters that compoſe this amiable Maiden's Name.

IV. QUESTION 465, *by Mr.* Geo. Brown.

FROM two given Points, to draw two Lines to meet in the Circumference of a Circle given in Poſition and Magnitude, ſo that the Sum of their Squares ſhall be the leaſt poſſible.

V. QUESTION 466, *by Mr.* W. Chapman.

THERE are three Circles whoſe Diameters are 30, 20, and 25 Inches, having their Centers all placed in the ſame Right-line; whereof the Diſtance of the firſt from the ſecond is 30, and of the ſecond from the third 28 Inches; now you are deſired to determine the Diameter and Poſition of a fourth Circle, that ſhall touch all the three given ones.

VI. QUESTION 467, *by Mr.* W. Spicer.

SUrveying of a Field, I found the four Sides thereof to be 10, 9, 7 and 6 Chains, in a ſucceſſive Order: I likewiſe, at the two Extremes of the longeſt Side, took the Bearings of the oppoſite Angles, which were N. E. by E. and W. S. W. Hence the Content of the Field is required.

VII. QUESTION 468, *by Mr.* Tho. Barker.

SUppoſing two Sides of a Triangle to be given (equal to 25 and 16 Feet) whereof the greater is parallel to the Horizon; I deſire to know what the Length of the third Side muſt be, ſo that the Time of the Deſcent of a heavy Body along the ſame, ſhall be a Minimum?

VIII. QUESTION 469, *by* P. M. *of* Durham.

TO deſcribe the Circumference of a Circle thro' two given Points, and which ſhall cut off from a given Circle an Arc equal to an Arc given.

IX. QUESTION 470, *by Mr.* Patrick O'Cavanah.

ON one of the Banks of a certain River, ſtand four Windmills, all in the ſame Right-line; whereof the Diſtance of the firſt from the ſecond is known to be 150 Yards, of the ſecond from the third, 180 Yards, and of the third from the fourth, 200 Yards: Being on the oppoſite Shore, I found, by Obſervation, that the two middlemoſt of them ſubtended an Angle, at my Eye, of 15 Degrees; and that the Angles ſubtended by the firſt and ſecond, and by the third and fourth, were equal, the one to the other. Hence I would know (by Means of a Geometrical Conſtruction) not only the Breadth of the River, but alſo my particular Diſtance from each of the four Objects, in that Station.

X. QUESTION 471, *by Mr.* E. Rollinſon.

A Gentleman bought an Eſtate in Houſes for 1500l. which, being lett, brought him in 120l. per Annum, clear of all Expences and Deductions: At the End of 10 Years (moſt of the Houſes being out of Repair, and he not chooſing to be at the Expence of fitting them up) he ſold the whole Eſtate again for 800l. The Queſtion is, to find what Intereſt he made of his Money.

XI. QUESTION 472, *by Mr.* W. Bevil.

OUT of a Semi-circular Piece of Ground, the Radius of which is 12 Chains, I am to take a Garden with a Fence of 10 Chains (terminating in the Semi-circle) ſo as to contain the moſt Land poſſible; how many Acres will fall to my Lot?

XII. QUESTION 473, *by Mr.* Cha. Wildbore.

'TIS propoſed to divide a given Number into ſo many Parts, and ſo proportion'd among themſelves, that the continual Product of the firſt, the Square of the ſecond, the Cube of the third, the Biquadrate of the fourth, &c. ſhall be a Maximum.

XIII. QUESTION 474, *by Mr.* G. Witchell.

SUppoſing the Moon's Declination, as well as the Latitude of the Place to be given, I deſire to know, at what Elevation her Parallax in Altitude increaſes the quickeſt.

PRIZE-QUESTION, *by Mr.* O'Cavanah. *(Whoever anſwers it before* Candlemas-Day, *has a Chance for Twelve, and another for Eight* Diaries.)

TWO Perſons, A and B, whoſe Chances for winning a ſingle Game are as 3 to 2, the former having ſeven Guineas, and the latter four, enter into Play together, on Condition that A every Game ſhall ſtake two Guineas to B's one; and that the Play between them ſhall continue till one of them, either by having loſt his whole Stock, or for want of a complete Stake, is obliged to give out. The Queſtion now is, to find the Gain of B and the Diſadvantage of A in this Agreement; and to point out a general Method for the Reſolution of all Queſtions of this Nature.

Note, *M.* De Moivre's *Method will not give a true Solution; nor has there been any Rule or Method yet laid down by which ſuch Queſtions can be reſolved.* P. C.

The Queſtion by the very ingenious *Peter Walton*, requiring the Sum of the Series $x + \frac{x^2}{4} + \frac{x^3}{9} + \frac{x^4}{16}$ &c. by Means of circular Arcs and Logarithms, when $x = \frac{1}{2}$; is of a limited, and very intricate Nature, and what we could not venture to give in *Form* among the others, as ſome of our Correſpondents, we are convinced, would not allow it to be a fair one. It is worthy, however, to be obſerved, that it is only in the Caſe here propoſed (where $x = \frac{1}{2}$) and in that where $x = 1$ (x being poſitive), in which the Series ſeems poſſible to be ſummed in the Manner ſpecified. With reſpect to the latter Caſe, it is pretty well known, at this Time, that the Sum is expreſſed by Two-thirds of the Square of the Semi-circumference of the Circle whoſe Diameter is Unity. And if from the half of this Sum, half the Square of the H. Log. of the Number 2 be ſubtracted, the Remainder will be the Sum in the other Caſe, where $x = \frac{1}{2}$. How this is derived is left to be conſidered (agreeably to the Deſign of the Propoſer) by thoſe who have a Taſte for theſe ſubtile and abſtracted Speculations.

ERRATUM. *In the Diary for* 1757, *p.* 44. *l.* 4. *from the Bottom, read* aG *(for* mG).

An Alphabetical Catalogue *of the* Contributors to this Diary; *wherein the Numerical Letters,* i, ii, iii, *&c. ſhew which Ænigmas, and the Figures* 1, 2, 3, *&c. which Queſtions, each anſwered;* Æ. Q. *and* P. *denote the Solution of the Prize-Ænigma, Prize-Queſtion, or the Propoſing ſomething new;* q. p. *and* r. *reſpectively ſignify the Explanation of the Queries, Paradoxes and Rebuſes.*

MR. J. Aiſh ſome Ænig. all reb. Alfred Æ. and all reb. Mr. T. Allen moſt Ænig. 2, 4, 7, 13, P. Mr. Morris Applin all Ænig. but 8th, q. P. Mr. J. Atkinſon r. P. Mr. T. Baxtonden 1, 2, 3, 4, 5, 6, 7, 9, P. Mr. W. Bamfield all Ænig. r. 3. P. Mr. T. Baker all Ænig. r, q. 1 Qu. P. Mr. T. Barker all Ænig. r. 1, 2, 3, 4, 5, 6, 7, 8. P. Mr. Edw. Barraſs moſt Ænig. q. r. p. P. Mr. E. Batten, 1, 2. Mr. Ja. Beresford all Ænig. but viii. 1, 5. Beſſie Ænig. Mr. S. Bentley all Ænig. P. Birchoverenſis 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, P. Mr. Wyvell Blennerhaſſer r. q. P. Mr. Turner Boſton 1, 2, 3, 5. Mr. G. Brown 1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 12. P. Mr. T. Bramley P. Mr. R. Butler 1, 2, 3, 4, 5, 6, 7, 8. Mr. J. Burton moſt Ænig. r. P. Mr. G. Clarke Butler all Ænig. but viii. and Prize. r. P. Mr. J. Buddles moſt Ænig. 1, 2, 3, 5, 6. Miſs Molly Carde Æ. and 1 q. Chris. Cave 1, 2, 3, P. Mr. Pat. O'Cavanah 6, 7, 8, 9, 10, 11, 12, 13, 14. Q. P. Mr. L. Charlton, P. Mr. W. Chapman moſt Ænig. reb. 1, 2, 3, 5, P. Clora reb. Celia, P. Mr. J. Clough, Æ. r. q. P. Mr. Nath. Coly all Ænig. r. Clyſterus, P. Mr. W. Davies 1, 2, 3, 4, 5, 6, 7, 8. Mr. J. Draper, P. Mr. Tim. Drury moſt Ænig. r. 2, 3, 4, 5, 6, 10. P. Mr. Joſ. Doubleday, r. q. P. Mr. J. Dyke, q. r. P. Miſs Sally Edge all the reb. Eſruon, Æ. r. P. Mr. W. Fowler, 1. 6, P. Mr. Ja. Frowd, P. Gynophilus, Æ. P. Miſs Anne G----e, Æ. P. George 1, 2, 3, 4, 5, 6, 7. Mr. R. Gibbons all Ænig. r. q. 1, 2, 3, 4, 5, 7. P. Mr. Ja. Giles, r. 5. Qu. Mrs. Eliz. Goſling all Ænig. r. P. Mr. T. Harris all Ænig. r. 1, 2, 3, 4, 5, 6. P. Mr. Ja. Hayden all Ænig. but the 8. r. P. Mr. Joſ. Harrington all Ænig. 1. Mr. J. Hicks all Ænig. but viii. and Prize, 1, 3, 5. P. Mr. J. Hampſon 1, 2, 3, 4, 5, 6. P. Mr. D. Haſtings all Ænig. 5, 6. Mr. S. Hammond, Æ. P. Mr. S. Harlock, Æ. r. P. Mr. E. Houlſton all Ænig. but the viii. r. 1, 5. Mr. R. Hood, Æ. all r. P. Miſs Molly Holmes all Ænig. P. Hippocrates all Ænig. but viii. Hodge, Æ. Miſs Hoyden, Æ. P. Mr. W. Hubbard, i, ii, iii, iv, v, ix, x. Æ. P. Mr. C. Hutton, r. q. Mr. Abr. Horsfall all Ænig. r. 1, 2, 3, 4, 5, 6. Mr. J. Holliday all Ænig. r. q. P. Mr. French Johnſon, Æ. P. Mr. J. Johnſon all Ænig. but iii and viii, r. q. P. Mr. W. Ingram i, ii, v, vi, vii, ix, x and all reb. Mr. T. Kennerday, Æ. Mr. W. Kingſton all Ænig. r. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10. P. Mr. Steph. King all Ænig. 1, 2, 3, 5. Mr. G. Langley all Ænig. r. Mr. E. Langworthy, Æ. r. q. 3. P. Mr. W. Liſon moſt Ænig. r. q. p. 1, 3, P. Mr. R. Locke moſt Ænig. r. P. Mr. J. Lund, Æ. P. Mr. J. Lyon all the Ænig. but the viii. q. P. Mr. R. Marſh all Ænig. but the viii. and Prize. Matilda r. Dick Marſhal: Æ. Mr. R. Meanwell, P. Mr. Chris. Meſban moſt Ænig. r. q. 1, 2. Mr. Walt. Matthewſon moſt Æ. r. p. Mr. R. Mallock moſt Ænig. r. 1, 2, 3, 4, 5. Mr. J. Milbourn 1, 2, 3, 4. Mr. W. Miles, Æ. Mr. F. F. Mingle all Ænig. reb. q. P. Mr. Ant. Moore, P. P. M. 5, 6, 8, P. Barns Moyſe, Æ. r. P. Miſs A. Nicholls all Ænig. but 8th. r. P. 3 Math. Queſt. Mr. G. Nokes moſt Ænig. r. P. Mr. J. Nunn all Ænig. but the viii, r. q. P. Mr. T. Oſborne, Æ. r. Patient Grizzle, P. Mr. W. Penn, r. P. Penovius 2, 3, 4, 5, 6, P. Philarithmus 5, 7, 10, 11, 12, 13. Philetas all Ænig. but the viii. Mr. T. Pooke, Æ. Mr. J. Ramſay all Ænig. P. Mr. E. Rawſtorne, P. Mr. Rich. Rhyme, Æ. all reb. Mr. Alex. Rowe moſt Ænig. q. r. 1, 2, 3, 6. P. Mr. E. Rollinſon 7, 8, 9, 10, 11, 12, 13, 14. Roſalinda all Ænig. & reb. q. P. Mr. Joſ. Ruſton r. q. 1. 3. Mr. T. Sadler all Ænig. but iii, viii and Prize, all reb. 1 Qu. P. Mr. T. Sandling moſt Ænig. r. P. Mr. W. Spicer, all Ænig. but the viii, r. 1, 2, 3, 4, 5, 6, 7, 8, 9. P. Mr. R. Shilito all Ænig. but viii. and Prize. Miſs Eliz. Stevenſon i, ii, iii, iv, v, ix, x, Æ. Mr. Abr. Stone 1, 2, 3, P. Mr. W. Stoker 1, 2, 7. Mr. Iſa. Tarratt all Ænig. but viii. r. Mr. W. Toms 1, 2, 3, 5. Mr. T. Vaughan all Ænig. but iv. and viii. r. P. P. Walton 13, 14, P. Mr. Jona. Ward moſt Ænig. and all r. Mr. R. Walton all reb. 1 qu. Mr. J. Webſter Æ. P. Mr. Joſ. Waſtel moſt Ænig. r. 1. 2 qu. Mr. G. Witchell Cal. Eclipſes 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, P. Mr. T. Wilſon all reb. P. Miſs Molly Williter all Ænig. Mr. Cha. Wildbore 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, P. Mr. W. Wyld all Ænig. but v and viii, all reb. P.

FINIS.

The GENTLEMAN and LADY's
PALLADIUM,
For the Year of our LORD, 1760.

CONTAINING,
The WISDOM of GOD in his WORKS. An *Academical* MISCELLANY of NEW IMPROVEMENTS in Science. With the FESTIVALS and *remarkable* DAYS. And an EPHEMERIS for the *ſaid* YEAR: computed from a *New* THEORY, agreeing with *Obſervation*. NEW TABLES of COMPUTATION for *Greenwich-Royal*-OBSERVATORY. With *Remarks* on the *New* Diſcovery of the LONGITUDE.

The *Twelfth* Number publiſhed.

By the AUTHOR of the *Royal* ASTRONOMER and NAVIGATOR.

J. Wale inv. et del.
J. S. Müller Sc

How *various* are thy WORKS, CREATOR WISE!
How to the Sight *Beauties* on *Beauties* riſe!
Where ev'ry OBJECT ſhines divinely *bright*,
And TRUTH appears in her own native LIGHT!

Printed for J. SCOTT at the *Black-Swan*, in *Pater-noſter-Row*.
MDCCLX.

OF THE
Wiſdom of GOD in his Works.

OF GOD's INFINITE POWER AND GOODNESS.

THAT a Being neceſſarily and independently exiſting, poſſeſs'd of infinite *Wiſdom*, *Power*, and *Happineſs*, ſhould exert his *Power* in producing *innumerable* Multitudes of Creatures, and Worlds for their convenient Habitation and Happineſs, could proceed only from his infinite and *unbounded Goodneſs*. For, as to the *Notion* of his creating the Univerſe and it's Inhabitants with a View to his own *Glory* (who is independent) or to the Praiſe of his finite, dependent, and imperfect Creatures, is inconſiſtent with his *Supremity*, as an infinite GOD; in whoſe Sight the *whole* created Univerſe, with all its Inhabitants, are but as a *few* floating *Atoms* in the Sun Beams.

The Extenſiveneſs of the *divine Goodneſs* appears in his having condeſcended, from the Exaltation of his infinite Perfection, to provide a *ſuitable* Meaſure of Happineſs for every Order of his Creatures; from the higheſt *Archangel* down to the loweſt *Reptile*: for, by what we ſee in this *Part* of the *Univerſe*, where we inhabit, we have Reaſon to conclude, that Happineſs is allotted to every Order and *Rank* of Beings, ſuitable to their ſeveral Capacities, thro' the *whole*.

GOD *as he fram'd the whole, the whole to bleſs,*
On mutual Wants built mutual Happineſs. POPE's Eſſays.

Having ſhewn the infinite *Power* and *Goodneſs* of GOD, his *infinite Wiſdom* will alſo appear in the Works of his Creation.

OF VEGETATION AND ATTRACTION.

VEGETATION, or the Growth of all Sorts of *Plants*, from the ſmalleſt Spire of *Graſs* to the talleſt *Oak*, with the Production of all Kinds of *Fruits*, *Herbs*, *Roots*, *Grains*, and medicinal *Plants*, is brought about by the ſame ſimple and uniform *Principle* or Cauſe of *Attraction*, with which all bodily *Subſtances* are endued: Whereby the ſmall *Tubes*, of the infinite Number compoſing each Vegetable, gradually draw in the fluid Nouriſhment, which enlarges the Size thereof, and being concocted by the Sun's Heat, they are matured and thereby brought to Perfection.

That there is ſuch a *Principle* as *Attraction*, in Nature, appears by the Experiment of a ſmall Glaſs Tube or Pipe; one End of which being immers'd in a high colour'd Liquor, the *Fluid* will always viſibly aſcend to a conſiderable Height.

The Beating of the *Heart*, and Circulation of the Blood in *Man*, and all other Creatures, is aſcribed in the ſame Manner to ſome general or ſimple *Cauſe*, whether it be the *Weight* of the Atmoſphere, or whatever *elſe*.

Sir *Iſaac Newton* has made it plainly appear, that it is by one ſimple and uniform *Cauſe*, that a Stone or other heavy Body falls to the Ground, and that the *Moon* and all the *Planets*, *Satellites*, and *Comets* are kept in their Orbits, and made to revolve round their reſpective Centers of *Gravitation* or *Attraction*.

SEASONS PRODUCED.

IT is alſo known, that the whole Variety of *Seaſons* is owing to the moſt *ſimple* and obvious Contrivance that can be imagined; *that is*, to the Inclination of the Earth's *Axis* with the Plane of the Ecliptic.

EFFECTS OF WARMTH.

WHAT a *Number* of important *Effects* are produced by a ſmall Degree of *Warmth*, that depends upon the preciſe Situation of our Earth, at ſuch a Diſtance from the SUN, as is ſuitable to the *Státe* of it's Inhabitants? Every Obſerver may purſue this Conſideration in his own Mind, who will find the Truth of the Obſervation hold good univerſally throughout the WORKS of all Nature.

SEVERAL NOBLE ENDS PRODUCED from ONE ELEMENT or CAUSE.

Another *general Obſervation* may be made, on the Works of Creation, ſetting forth the *Divine Wiſdom*, as much as any of the wiſe Contrivances that can be remark'd; which is, that there is not one Part or Member of the immenſe Whole, but what ſerves to ſeveral *different Purpoſes* at the ſame Time, and anſwers each of its various Ends as fully as if it had been intended for that one ſingle Purpoſe. We may conſider, under this *Head*, every *Species* of the Brute Creation, which at the ſame Time were made to enjoy a certain Portion of Happineſs, were alſo made to ſerve either for our *Nouriſhment*, for the *Culture* of our Lands, for our *Clothing*, for Food to other Creatures deſtined for our Nouriſhment, and other Uſes of Creation ſubſervient to one another. In like Manner we may conſider the Air anſwering the End of *Reſpiration*, while it ſerves for the *Conveyance* of the winged Race, for *Navigation*, for raiſing *Clouds* and Vapours, from whence Dew and Rain deſcend to the Earth, ſo neceſſary for *Vegetation*; for correcting and clearing the Earth of noxious and peſtilential Vapours, by Means of its Currents, or Winds; for refracting or bending the Sun's Rays, by which means we enjoy his Light both before he is riſen, and after he is ſet; and to which Cauſe we owe the grateful Morning and Evening Twilight; for working ſeveral *Machines*, Windmills, and the like; for being the Vehicle of all Manner of Sound, and producing the noble Effects of *Muſic*, from all kinds of muſical Inſtruments; and various other important Purpoſes; among which it may be obſerved that *Gunpowder* is of uſe only by means of Air, and would be entirely uſeleſs without it. And in the ſame Manner any other elementary Part of Nature may be conſidered as miniſtring to different Ends; as we may find the minuteſt Object we can caſt our Eyes or turn our Minds upon, is made to anſwer more Purpoſes than one.

An ingenious *Mechanic* is admired for the Exactneſs of his Machine made to anſwer the *ſingle Purpoſe* it was deſign'd for; and more Purpoſes are not expected from its curious Contrivance. A good *Water Engine* could never anſwer the End of an *Aſtronomical* Clock, an Air-*Pump*, and *Windmill* at the ſame Time; and the more complicated the human Machine, the leſs perfect and exact are the Movements. In the Divine Contrivances and Workmanſhip, it is far otherwiſe, where we may obſerve innumerable and different important Purpoſes produced by one ſimple and uniform *Cauſe*, and all theſe Purpoſes or Effects as regularly and properly brought about, as if a diſtinct Cauſe had been appointed to produce each ſingle Deſign.

VARIETY and UNIFORMITY *throughout* the CREATION.

Another *general Obſervation* of the *Wiſdom* that appears in the Divine Workmanſhip, is, that throughout the known Univerſe there appears an *aſtoniſhing Variety* united with the moſt regular *Uniformity*; and Uniformity amidſt Variety is the Idea of *Beauty* and *Perfection*: which two Properties ſeem to vie with each other as far as our Reſearches, in Nature, extends. If we conſider either the Animal or vegetable World, the Inhabitants of Land, or of the Waters, the Minute or the Great Bodies in Nature, in every reſpective *Species*, the Variety how extenſive! yet the Uniformity how cloſe! The Difference between the ſpreading *Oak* or towering *Cedar*, and the humble Shrub, how great! yet the Reſemblance how near! Nor are there any two Trees or Plants of *different Species*, but what differ eſſentially; nor even any two of the *ſame Species* to be found exactly alike: yet are all form'd on the ſame *general Plan*; all produc'd from Seeds, and vegetating in the ſame uniform manner, from the ſame Principle.

Again it may be obſerved, how many Millions of the *Animalcula* diſcover'd by the help of *Microſcopes* in Vinegar, in Pepper-Water, in Infuſions of almoſt all kinds of vegetable Subſtances, and indeed throughout the *Air*, *Earth*, and *Water*, would go to make up the Weight of an *Elephant* or a *Whale*? Yet each *Animalcula*, though of a *Size* ſo ſmall, as ſome are known to be, that a Grain of Sand is big enough to cover and ſmother ten Thouſand of 'em, has a *Body*, *Head*, *Eyes*, and *Mouth*, and probably a *Brain* and *Heart*, and, without Doubt, *Veins*, *Arteries*, and a *Fluid* circulating through them; and alſo *Nerves*, *Muſcles*, *Tendons*, and moſt of the Parts of the *largeſt Animals*. How different are the Elements of Air and Water, ſo that the Inhabitants of one cannot, generally ſpeaking, ſubſiſt in the other? Yet theſe Elements or Fluids, agree in moſt of their uniform Properties. How different is the manner of Life of the Inhabitants of the Land and Water? Yet how nearly allied to one another in the Frame of their Bodies and Senſes. And how endleſs *Variety* appears in the Properties and Effects of different Material Subſtances. How different a *Lump* of Lead from a Piece of *Cork*? An *Ingot* of Gold half a Foot long and half an Inch thick, capable of being drawn out into a *Wire* to reach from *London* to *York*, how different from the Subſtance of a *Rock*, or Sand of the *Mine* in which this *Metal* is found? And how different that Wonder of Nature, the *Loadſtone*, in the Effects it produces, from the common *Pebble*: *Quickſilver*, by *Chemical* Operation, is capable of numerous Changes in its Colour and Conſiſtence, which in one *State* is a deadly *Poiſon* and in another a noble *Medicine*, which may be forc'd by Fire into a hundred different Shapes, yet after all may be reduced to its original running *Mercury*. And the Life of Man is too ſhort to make all the Experiments that the Mineral called *Antimony* is capable of, in the various Changes it may undergo in its Form, and Noble Effects, to be thence derived on the human Body. A little *Rain-Water* ſtrain'd through the Veſſels of the *Vine*, forms its *Root*, the *Wood*, the *Bark*, the *Pith*, the *Leaves*, the *Bloom*, and the *Fruit*, all different in Qualities, as well as in their outward Appearances and Effects; yet come all under the Diſtinction of one general Claſs of *Vegetable Subſtances*.

VARIOUS PRODUCTIONS of the VINE.

THE Fruit of the *Vine*, before it is ripe yields Verjuice, a Liquor quite different from all other vinous Ones; which when ripe and dried in the Sun affords a fœtid Oil and hot Spirit, by Diſtillation. If the Grapes be dried and boiled they make a ſweet Liquor, which being diſtill'd yields an Oil and Spirit much like thoſe from Raiſins; The Juice of the Grape ſqueez'd out and fermented becomes firſt a ſweet and turbid Liquor, call'd *Muſt*, which is quite different in Nature and Effects from Wine. This Liquor by Degrees becomes leſs ſweet, and clearer, and is at laſt matur'd into Wine; which, by Diſtillation, affords an inflamable Spirit. It will alſo, in *Chriſtallization*, ſhoot into Salts, and yield a great Proportion of a Liquor as ſweet as Honey. Beſides the Wine itſelf, the fermented Juice of Grapes affords *Ices* and *Tartar*, which laſt may be analiſed into *five* different Subſtances; all leſs *acid* than Tartar itſelf. *Wine* likewiſe degenerates into Vinegar, from which may be obtain'd a Spirit, by Fire, and a Salt different from thoſe of *Tartar*. Thus the ſame Original

Matter, a little *Puddle-Water,* may be chang'd into almoſt *thirty* different States in this ſingle Plant.

GENERAL PROPERTIES of MATERIAL SUBSTANCES.

But Naturaliſts ſhew that *Salts, Acid, Alkaline, Volatile,* and lixiviate; *Spirits, vinous, urinous,* and *acid*; *Oils* of all Kinds; *Sulphurs* of all kinds, and even *Mercury,* may be produc'd out of almoſt all kinds of Subſtances. However, amidſt all this endleſs Variety of the Properties of Matter, it is certain that all material Subſtances agree in the general Properties of *Extenſion, Gravity* and *Impenetrability.*

And further, if we conſider the whole Solar *Syſtem,* under the Head of *Variety* and *Uniformity,* no two Planets can therein be found whoſe *Periods, Magnitudes, Velocities, Diſtances,* or *Planes,* are the ſame; yet all agree in being nearly of a round Figure, and in being carried round their Centers of Motion, nearly in Circles, with Velocities in a certain general Proportion to their reſpective Diſtances.

All BEINGS of DIFFERENT SYSTEMS have SIGHT.

The *Fix'd Stars* are in all Probability very different from one another in Magnitude, in their Revolution round their own *Axes,* and other Circumſtances; but they all agree in being *luminous Bodies*; and if Aſtronomers are right in ſuppoſing them all to be Suns to different *Syſtems,* with their reſpective planetary Bodies moving round them, the Inhabitants of thoſe Planets, however they may differ from one another, may, yet be ſuppoſed with Probability, all to agree in one Circumſtance, of being Creatures univerſally endowed with the Senſe of *Seeing*; or to what Purpoſe are they furniſh'd with ſuch a Profuſion of Luminaries!

WISDOM defin'd and SHEWN.

The proper *Definition* of Wiſdom is the *chooſing the fitteſt Means to accompliſh the greateſt Ends.* The principal and great End the *Supreme Being* had in view at his Creation of the Univerſe, was the Happineſs of innumerable rational and ſenſitive Creatures; than which Deſign a greater and more important one cannot be imagined. And that the *Divine Wiſdom* has choſen, in every *Inſtance,* the very beſt, or rather the only Means, for anſwering each reſpective End, and likewiſe a Variety of Ends by one and the ſame ſingle Means, is not only demonſtrable *a Priori,* from the infinite Wiſdom of God admitted, deducible too from the Works of the whole Creation; but is likewiſe to be proved *a poſteriori,* from Experience and Obſervation of his Works, as far as our Enquiries are able to go; and the more deeply we ſearch into his admirable Works, the more of deep Contrivance and Deſign we find, and the more of Fitneſs in the ſeveral Cauſes to produce the intended Effects.

But the *Greatneſs* of that Power and Wiſdom which has been exerted in every Object of the *Creation*, will beſt appear by conſidering the GREAT WORKS of the *Sun*, *Moon*, *Planets*, *Satellites*, *Comets* and *fix'd Stars*. The largeſt and beſt *Teleſcopes*, and the *Sagacity* of the ableſt Aſtronomers, have furniſhed us with an amazing Account of our *Solar* Syſtem, and of the *Immenſity* of Creation.

BY WHAT MEANS the DISTANCES of the GREAT BODIES are KNOWN.

FIRST it is proper to obſerve, that the *real Magnitudes*, *Diſtances*, *Orbits*, and other Affections of the great Bodies of our Syſtem are determined by what Aſtronomers call the *Parallaxes* of thoſe Bodies; and by their *Elongation* from the Sun, their *apparent* Magnitudes, and other analogical Methods, when their Diſtances are not too great to afford a certain *Parallax*, which would require too much Room here to explain. ASTRONOMERS, for *Example*, know certainly the Diſtance of the Moon from the Earth to be 240 Thouſand Miles; becauſe the Moon yields a very ſenſible *Parallax*. And they know that the Sun's Diſtance from the Earth is at leaſt ten Thouſand times the Diameter, or Thickneſs of the Earth, which is about eight Thouſand Miles; and brings the whole Diſtance of the Earth from the Sun to about eighty *Millions* of Miles; this is the *leaſt* Number of Miles, not to be doubted, that the Sun is from our Earth; but it is not certainly known whether his Diſtance from thence may not be a great deal more. In the *Year* 1761, the Diſtance of all the Planets from the Sun will be determined to a greater Degree of Exactneſs than heretofore; by an Obſervation of the *Tranſit* of the Planet *Venus* over the Sun's Face; which will happen on *June* 6^{d}. 5^{h}. 55^{m}. Morning, in that Year, N. S. 4′ 15″ South of the Sun's Center. But according to the preſent *Theory*, the Sun, to appear of the Magnitude he does to our Eyes, at the Diſtance of eighty Millions of Miles, muſt be a Body almoſt eight hundred Thouſand times larger than our Earth. So that if the Sun's Center were plac'd where the Center of the Earth now is, his outward Surface would extend 140 Thouſand Miles higher than the Orbit of the *Moon*; his Diameter or Thickneſs being 760 *Thouſand* Miles; whereas the Thickneſs of the Earth is but about eight Thouſand.

AN ACCOUNT OF THE SOLAR SYSTEM.

This *amazing* World of Fire, the SUN, turns round his own *Axis* in 25 Days, and 6 Hours. This is known by a Number of *duſky Spots*, appearing upon the Sun's Face, ſo as to be ſeen ſometimes with the naked Eye, when he ſhines thro' a *Miſt*, or thin Cloud; but are always obſervable by the Help of a

Teleſcope, with a dark Glaſs, for the Security of the *Eye*. Theſe Spots could not be viſible at the Sun's Diſtance, if they were not as large as the whole Earth; but ſuch of them as appear of a conſiderable Breadth, as they often do, muſt be vaſtly larger than the Earth. They never continue long to make the ſame Appearance; but are frequently riſing and vaniſhing. They are moſt probably, *Exhalations*, floating in the Sun's Atmoſphere, at ſome Diſtance from his Body. His Circumference is computed to be about 2 Million, 398 Thouſand Miles. He is agitated by the various Attractions of the Bodies, revolving round him, to deſcribe a ſmall *Circuit* round the Center of the *Syſtem*. This *glorious Luminary*, the Center of our Syſtem, has *ſix* opaque Globes, beſides their *Attendants*, commonly called the Planets, going round him at different Diſtances, and in different *Periods* of Time, all from *Weſt* to *Eaſt*, (cauſing his apparent Motion to us from *Eaſt* to *Weſt)* according to the following Order.

OF MERCURY.

I. MERCURY, about 1 *twentieth* Part as big as our Earth, finiſhes his Courſe in 87 Days, 23 Hours, being his Year; at the Diſtance of about a Thouſand of the Earth's Diameters, or 32 *Millions* of Miles from the SUN. But no *Spots* appearing on his *Face*, or Surface, and being view'd ſo near the Sun, that the Time of his Turning round on his *Axis*, or the Length of his Days and Nights, as yet is not known. His Circumference is about 13 Thouſand 3 Hundred Miles: Who moves at the *Rate* of about 16 Hundred and 5 *Miles*, every *Minute* of Time, in his Orbit. The Heat of the Sun in *Mercury* (if there is no Proviſion made to abate it) muſt be ſuch as would keep all the Waters upon Earth conſtantly boiling: And the Brightneſs of the Sun's Light muſt there be quite intolerable to Eyes like ours. But it does not follow from thence that *Mercury* is therefore uninhabitable; ſince it can be no Difficulty for the divine Power and Wiſdom to accommodate Inhabitants to the Place they are to inhabit; as we ſee *Frogs* and *Fiſhes* endure *Cold* very well, that would ſoon deprive our *Species* of Life. To an Eye ſuch as ours, the Sun ſeen from this Planet would appear ſeven Times as large as he appears to us. *Mercury* is ſeen with *Teleſcopes* in all the Shapes of the Moon except Full; ſometimes horned, and ſometimes like a half-Moon, but never fully enlightened; becauſe that Side of this *Planet* on which the Sun ſhines is never turn'd full towards us; except when he is ſo near the Sun as to be loſt in the Brightneſs of his Beams. His enlighten'd Side is always towards the Sun, which ſhews that he only ſhines by his borrowed Light from the Sun. That this Planet revolves round the Sun in an Orbit nearer to him than that of the Earth is plain; becauſe he is never ſeen oppoſite to the Sun, but always in the *Weſt*, when he is ſeen at *Sun-Setting*; but in the *Eaſt* when he is ſeen at *Sun-Riſing*; and at a Diſtance from the

Sun never above 28 *Degrees*; a Degree being about twice the apparent Breadth of the *Sun* or *Moon*.

Mercury's Orbit is inclined 7 Degrees to the Earth's Ecliptic; and the Place of his aſcending *Node*, where he croſſes the Ecliptic to the Northward is in about 16 Degrees of *Taurus*, in the Year 1780, the oppoſite Point of the Ecliptic to which, when he croſſes the deſcending *Node* to the Southward is in 16 Degrees of *Scorpio*, to which Places the Sun apparently comes on the 5th *May* and 7th *November*, N. S. And when *Mercury* comes to either of his *Nodes* at his *Inferior Conjunction*, at or near theſe Times, he will be ſeen to paſs over the Face of the Sun, like a dark round *Spot*. But, in all other Parts of his Orbit, his Conjunctions are inviſible; becauſe he paſſes above or below the Sun.

BY COMPUTATION MERCURY paſſes over the SUN's FACE, viſible at *Greenwich*.

New { 1782 *Nov* 12^{d} 3^{h} 44^{m}. Afternoon } 15′$\frac{1}{2}$ N } from ☉
Style. { 1786 *May* 4 6 57 Forenoon } 12′$\frac{1}{4}$ N } Center.
1789 *Dec.* 6^{d} 3^{h} 53^{m} Afternoon } 7′$\frac{1}{3}$ S } from the Sun's Cen-
1799 *May* 7 2 34 Afternoon } 4′$\frac{1}{3}$ S } ter.

N. B. *There will be ſeveral intermediate Tranſits, but inviſible.*

There are other Properties of *Mercury* and his Orbit; of his *Seaſons*, &c.

OF VENUS.

II. VENUS, at the Diſtance of about 59 Million of Engliſh Miles, revolves round the SUN, in 224 Days 17 Hours of our Time nearly; at the Rate of 1 *Thouſand* 146 Miles per Minute, in her *Orbit*, including in it the Orbit of *Mercury*: For ſhe is always ſeen in the Neighbourhood of the *Sun*, and never appears in the *Weſt*, when the Sun is in the *Eaſt*, nor contrariwiſe, nor ever removes above 48 Degrees from him. When ſhe is on one Side of her Orbit, Weſt of the Sun, ſhe is our *Morning Star*; and when on the other Side of her Orbit, Eaſt of the Sun, is our *Evening Star*; being each by Turns for 290 Days. This may ſeem ſurprizing that *Venus* ſhould be longer on the Eaſt or Weſt Side of the Sun than the Time ſhe takes to perform her Revolution round the Sun, in about 225 Days; but, if we conſider that the Earth is going all the while round the Sun, with the *Obſervator* upon it, the ſame Way with, tho' not ſo quick as, *Venus*, the Wonder vaniſhes; becauſe the Difference of the Motions between the *Earth* and *Venus* will be equal to the Motion gone forward of the Earth by *Venus*, in 290 Days, being but about 179 Degrees of a Revolution of *Venus* with the Earth, performed not in leſs than 584 Days, *nearly*.

This Planet is about the Bigneſs of the Earth, and turns on her *Axis* in 23 Hours, as the Earth turns on her's in 24 Hours. She appears thro' a *Teleſcope* in all the Shapes of the

Moon to a naked Eye, partly enlighten'd and partly dark, and with the ſame *Inequalities* on her Face, as on that of the Moon. Some *Aſtronomers* fancy they have ſeen a Moon or Satellite near *Venus*, but have not yet aſſur'd themſelves of it; but may at her Conjunction with the Sun, 1761, when it can hardly be hid all the 6 Hours *Venus* is on the Sun's Face, if there be a Satellite.

The Orbit of *Venus* is inclined to the Earth's Orbit about 3½ Degeees, and croſſes it in about 14½ of *Gemini* and *Sagittary*, and conſequently when the Sun is apparently at or near theſe Points in her *inferior* Conjunction with the Sun, ſhe will appear like a *black Patch* on his Face; and will afford a Method of determining the Diſtances of all the Planets from the Sun (as we before obſerved) more certain than heretofore known. Theſe Appearances but ſeldom happen, and will be but three Times viſible at *Greenwich*-Obſervatory for 300 Years to come, as follows.

VENUS will appear on the SUN's FACE.

New Stile	1761 *June*	6^d	5^h	55^m	M.	4′	15″	South	from ☉'s Center.
	1996 *June*	8	2	13	Af.	13	36	South	
	2004 *June*	6	7	18	Fo.	6	22	Nor.	

N. B. There are other Properties of *Venus* and her Orbit; of her Seaſons, *&c.*

OF THE EARTH.

III. THE EARTH, which we inhabit, poſſeſſes the next Place in our *Syſtem*, and, at the Diſtance of about 80 *Millions* of Miles from the Sun, performs her yearly Revolution round him, in 365 Days 5 Hours and 49 Minutes of Time from the *Æquinox* or *Solſtice* to the ſame Points again; but not till after 365 Days 6 Hours 9¼ *Minutes*, from any *Fix'd Star* to the ſame again; the former being call'd the *Tropical*, and the latter the *Sidereal* Year.

The Earth's Motion in its Orbit, tho' 120 Times ſwifter than that of a Cannon-Ball, is but little more than *half* the Swiftneſs of *Mercury*'s in his Orbit.

It's Motion is like that of a *Bowl* upon a *Bowling-Green*; proceeding forward at the Rate of about 968 Miles in a *Minute* of Time, along its Orbit, while it turns partly round its *Axis*, or carry its Inhabitants at the Equator, about 17 *Miles* in that Minute.

There is no more Reaſon to doubt that the Earth moves, in this Manner, round the Sun than there is for a Paſſenger in a Ship ſailing in a River or ſmooth Water, to doubt whether the Ship he was in moved, or the Objects on the Shore, that appear'd to move. We ſee the Sun continually change his Place with reſpect to the *fix'd Stars*, and muſt own it to be highly improbable that this Change is owing to any Change in the whole Heavens; which conſidering the amazing Diſtance of the *Starry Heavens*, would require a Motion infinitely more rapid than that which is aſcribed to the Earth. As for the common *Objection* againſt the Earth's Motion, that we are inſenſible of it, and that a Stone thrown up from the Earth ought not to fall down on the ſame Place again; it is anſwer'd at once by a Ship moving ever ſo ſwiftly along; from whence if a *Ball* be fired directly up in the Air, or let fall from the Maſt-Head, it will fall exactly in the ſame Place on the Ship's Deck, as if She had no Motion, or were at an Anchor, as experience proves; and becauſe whatever Motion the Ship has forward, the ſame muſt be *exactly* communicated to the *Ball*, ſo as always to bear the ſame Relation to the Ship's Place, And as to the *Objection* taken from the *Scripture* Expreſſions, which ſeem to contradict the Theory of the Earth's Motion, it is plain, from innumerable *Inſtances*, that Revelation was not deſigned to make Mankind Philoſophers, or Reaſoners about the Nature of Things, but to improve them in Virtue and Morals. And therefore it was fit the Scripture Expreſſions ſhould be accommodated to the vulgar Opinion, and Notions of Men; eſpecially in all ſpeculative Points which had no direct Influence on Men's Lives and Morals. The Truth of this Matter is, that the incomparable Sir *Iſaac Newton* has demonſtrated the Motion of the Earth, with that of all the other *Planets*, and *Comets* round the Sun, and of the Satellites round their reſpective *Primaries*, on ſuch undoubted Principles, that he has eſtabliſhed the ſame beyond all Diſpute; except to thoſe who are void of Underſtanding. The Sun's apparent *Riſing* and *Setting* is found to be owing to the Earth turning round its *Axis* from Weſt to Eaſt, while it goes on in its Orbit, cauſing an apparent Motion thereby in the Sun from *Eaſt* to *Weſt*. And the Sun's apparent Change of Place, among the *fix'd Stars*, is found to be owing to the Earth's real Change of Situation, moving round the Sun. The different Seaſons of the Year, with all the delightful Varieties thereof, are found to be owing to the *Inclination* of the Earth's *Axis* to the Plane of the Ecliptic, in which the Sun always appears to move; being 66 Degrees 31 Minutes and a half, at this Time, 1760; but continually varies a ſmall Matter; owing to the combin'd Effects of the attracting Bodies, in their ſeveral Approaches to the Earth's Revolutions round the Sun.

Any Perſon, who has not an Opportunity of ſeeing an *Orrery*, may eaſily repreſent this Motion of the Earth round the Sun by an *Apple* or other round Body with a Skewer or *Wire* thruſt thro' its Middle, and carried about a round Table, with a Candle plac'd in the Middle thereof. If the lower End of the Skewer or *Wire* be made to touch the Table all the Way, while the *Object* moves round to them a little, the upper End ſtill pointing towards the ſame Part of the Room, by turning the *Skewer* round, as it is carried along, it will be eaſy to underſtand how the Earth's turning round on her *Axis*, makes a *Day* and *Night*; and by carrying the *Object* quite round the Table, it will be eaſy to ſhew how the *Sun* (repreſented by the *Candle*) muſt appear to change Place with reſpect to the *fix'd Stars*; and by obſerving how differently th

Candle enlightens the different Part of the *Apple*, or round Object in Motion, as the *Wire* points towards it, or from it, to the ſame Part of the Room, kept always *parallel*, the Cauſe of the different Seaſons, of the Length of the Days, and Nights, of the Sun's ſhining more directly, or more obliquely, on different Parts of the Earth, and of the Heat of *Summer*, and Cold of *Winter*, will appear to any Capacity. That the Earth is nearly of a round Figure is plain from the Shadow it caſts upon the Face of the Moon in a *partial* Eclipſe of that Body; Which Shadow is always round, and never ſeen in another Figure. And the Roundneſs of the Earth's Figure is further manifeſted in the gradual Approach of a Ship at Sea; firſt ſhewing it's *Maſts* and *Sails*, and then its lower Parts, 'till the whole is viſible; and the contrary happens of a Ship ſailing from us till ſhe is quite out of Sight. To which may be *added* the Proof of the Earth's Roundneſs from a Ship going round it by continual ſailing to the *Weſtward*, as has been often experienced. The *Hills* on the Earth's Surface no more hinder the *Roundneſs* of its Figure than Grains of Duſt hinder the Roundneſs of the artificial or common Globe; between which there is a like Proportion.

OF THE MOON.

The MOON is a Satellite, carried round the Earth (while the Earth moves round the Sun) in 27 Days, 7 Hours, and about 43 Minutes; but comes not again in *Conjunction* with the Sun (becauſe of the Earth's Motion the while) 'till 29 Days, 12 Hours, and about 44 Minutes, which is called the Moon's *Pyriodical* Revolution with the Sun. The Moon's Circumference is 6 Thouſand 850 Miles, add her Diſtance from the Earth 240 *Thouſand* Miles, moving in her Orbit about 38 Miles every Minute, turning round her *Axis* exactly in the Time ſhe moves round the Earth, by which Means ſhe keeps the ſame Side, or Face, always turn'd towards us; making her Night and Day together as long as our *lunar Month*. That the Moon goes round the Earth as her Center is evident to Sight; for when ſhe is between the Sun and Earth, at New, She is inviſible to us, her dark Side being then turn'd towards us; when ſhe goes a little way forward, from *New*, ſo as to come between us and the Sun, we ſee that ſmall Part of her Body enlighten'd, of the enlighten'd half next the Sun; and ſo on ſtill more and more, of the enlighten'd half next the Sun appears to us, till ſhe comes to be in full Oppoſition to the SUN, when we ſee all that Side of her Face, or *enlighten'd half*, which the Sun ſhines upon. This *Matter* is explain'd to any Capacity, by carrying a ſmaller Apple or Ball to repreſent the Moon, round the Earth, while ſhe is carried round the Sun, or Candle in the midſt of a round Table, and obſerving how the Candle enlightening the little *Ball* muſt appear to an *Inſect* upon the larger Ball of the Earth.

Eclipses of the Sun.

Whenever the Moon happens to come nearly or exactly between the Earth and the Sun, (happening at New Moon) ſhe ſtops the Light of the Sun ſhining upon the Earth, and then we ſay the Sun is eclipſed; though in reality the Earth is eclipſed. And according as the Moon happens to hide a Part or the whole of the Sun's Face, by her coming between the Sun and our Sight, we call it a *partial* or *total* Eclipſe of the Sun. If a total Eclipſe of the Sun happens when the Moon is at her greateſt Diſtance from the Earth, (for ſhe goes round the Earth, not in a Circle, but at different Diſtances in her Orbit) and conſequently has the *leaſt* apparent Diameter or Breadth poſſible, ſhe does not cover the whole Face of the Sun, but a Ring or bright Circle then appears round the Edge of the Moon, which is therefore call'd an *annular Eclipſe* of the Sun. But if the Moon happens to come *directly* between the Earth and Sun, when ſhe is at the *leaſt* Diſtance from the Earth, ſhe appears then ſo large, as to cover the Sun's whole Face, it is called a Central or total Eclipſe, and thereby cauſes Darkneſs for ſome Minutes.

Eclipses of the MOON.

When the Earth comes nearly or exactly between the Sun and the Moon, the Earth's *conical* Shadow is projected on the Moon's Body, and involves her in it, *partly* or *wholly*, (happening always at *Full-Moon*) when her Face is *partly* or *wholly* obſcur'd, and is therefore called a partial or total Eclipſe of the Moon. The Earth being a Body thirty or forty Times larger than the Moon, (being as the Cubes of their Diameters) caſts a Shadow large enough to eclipſe the Moon, at her Diſtance, if her Diameter were 3 Times more than it is; whereas the Shadow of the Moon thrown upon the Earth, is never large enough to eclipſe it's whole Surface, or Face together; but the *Moon's Shadow* firſt lights upon ſome particular Part of the Earth, and then travels at a certain Rate of Swiftneſs over different Parts of its Surface, during the Continuance of an Eclipſe of the Sun; to whoſe Inhabitants only that Eclipſe of the Sun is ſeen. And therefore Eclipſes of the Sun are not ſeen in all Parts of the Earth, (or rather all Parts of the Earth are not eclipſed) even in the Day: For where the Moon's *Shadow* does not come there can be no Eclipſe of the Sun. And if the Conjunction of the *Sun* and *Moon* happens in the Night, no Eclipſe of the Sun can be viſible to ſuch Inhabitants.

If the Moon revolved round the Earth in the ſame Plane as the Earth does round the Sun, there would be *conſtantly* an Eclipſe of the Sun at every *New Moon*, and of the Moon, at every *Full-Moon*. But, to prevent this Inconvenience, the Author of Nature has contrived that the Courſe of the Moon round the Earth is ſometimes above and ſometimes below the Courſe of the Earth, round the Sun, whereby their Shadows generally miſs falling upon one another.

Theſe Motions of the *Earth* and *Moon* are ſo exactly regulated, and known by a Courſe of long Obſervation, that Aſtronomers can foretell the Times of all the Eclipſes of *Sun* or *Moon*, that will happen for many Hundred Years to come, within a few Minutes; than which there cannot be a more *remarkable Inſtance* of the human *Sagacity* in diſcovering the Truth of the Works of GOD; or the Laws by which the vaſt Bodies in our *Syſtem* continue to move in their Orbits.

It is certain from Obſervation made with the beſt *Teleſcopes*, that though the Face of the Moon is cover'd with numerous *Inequalities*, like the Mountains and Valleys upon our Earth, yet there are no great Collection of Waters upon it like our Seas or Oceans; nor is there any Reaſon, from the Appearance of her Face through the beſt Glaſſes, to conclude ſhe has any ſuch Atmoſphere as attends our Earth.

If the Moon is inhabited (and it is probable ſhe is) with ſuitable Inhabitants, thoſe who live on one Side or Hemiſphere can never ſee our World, and thoſe who live on the contrary Side, of the Moon, never loſe Sight of us; except when the Earth comes between them and the Sun; as the Moon keeps always the ſame Side turn'd towards us.

Thoſe Inhabitants of the Moon who live about the middle Part of her Hemiſphere, next the Earth, muſt ſee it always directly over their Heads, with much the ſame Appearance as the Moon makes to us; ſometimes horn'd, ſometimes halfed, and ſometimes *fully* illuminated, and alſo gibbous, but about thirteen times larger than our Moon.

The Moon's *Attraction* acting more effectually on the *fluid* than ſolid Parts of our *terraqueous* Globe, in Conjuction with the Sun's *Attraction*, are the Sole Cauſes of our Tides, in all their Variety of Circumſtances; as Sir *Iſaac Newton* has demonſtrated.

☞ There are other Properties of the Moon, concerning her *Seaſons*, Length of her Year, *Longitude* of her *Places* eaſy diſcoverable, &c.

OF MARS.

IV. MARS, at the Diſtance of 123 *Millions* of Miles, goes round the SUN, in one Year, 321 *Days*, 22 *Hours*, and about 18 *Minutes* of our Time; but (by the Earth moving the while) he returns not in Conjunction with the Sun 'till 2 Years, 49 Days, 22 Hours, and about 29 Minutes, according to the Difference of Motion of the *Earth* and *Mars*: He travels at the Rate of 779 Miles *per Minute* forward in his Orbit, turning the Inhabitants at his Equator about 9 ¼ Miles *per* Minute round his *Axis*. His Quantity of Light and Heat is about one half as much as ours; and the Sun appears to his Inhabitants but half as big as to us. This *Planet* is reckon'd conſiderably leſs than our Earth (*but how much leſs is not exactly determin'd*) and if any Moon attends it, ſhe muſt be very ſmall, and is not yet diſcover'd. His *Aſpect* is of a ruddy Colour, or fiery red; and by his *Appulſes* to certain *fix'd Stars*, he ſeems to be ſurrounded with a very groſs Atmoſphere. He is ſeen ſometimes *gibbous*, but never horned; proving that his Orbit includes that of the Earth, and that he ſhines by a borrow'd Light.

Our *Earth* and *Moon* appears to the Inhabitants of *Mars*, like two Moons, a bigger and leſs; changing their Places with each other; and are ſeen ſometimes horn'd, and ſometimes half, or three Quarters illuminated, but never *Full*. And their Diſtance aſunder of 240 Thouſand *Miles*, dwindles to an Angle of about a Quarter of a *Degree*, or half the Moon's Breadth; under which they are ſeen ſubtended from *Mars*. To whoſe Inhabitants our *Earth* appears almoſt as big as *Venus* appears to us, and is never ſeen above 48 *Degrees* from the Sun.

From *Mars* the Earth appears to paſs over the Sun's Face, as do likewiſe *Mercury* and *Venus*. But *Mercury* cannot be ſeen from *Mars* by ſuch Eyes as ours, unleſs aſſiſted by proper Teleſcopes; except when he paſſes over the Sun's Face. And *Venus* will be as ſeldom ſeen as *Mercury*.

Jupiter and *Saturn* are as viſible to the Inhabitants of *Mars*, as they are to us. The *Axis* of *Mars* is nearly perpendicular, and his Orbit 2 *Degrees* inclin'd, to the Earth's Orbit, or Ecliptic. The Earth and Moon will appear from *Mars* much larger ſometimes than at others, as *Mars* appears to us; the Diſtance between us in one Part of the Revolution being 5 or 6 Times leſs than at the Part oppoſite.

OF JUPITER.

V. JUPITER is the largeſt of all the planetary Bodies, moving round the Sun in an Orbit ſuperior to that of *Mars*, in the Period of 11 *Years* 313 *Days* 8 *Hours* and about 35 *Minutes*; but being the ſwifter Body, (the Earth moving the while) he returns in Conjunction with the Sun in 1 *Year* 33 *Days* 21 *Hours* and about 16 *Minutes*; according to the Difference of the Motions of the *Earth* and *Jupiter*.

Jupiter is about 424 *Millions* of Miles from the *Sun*, who moves at the *Rate* of 425 Miles *per* Minute forward in his Orbit, and turns his Inhabitants at the Equator about 432 Miles round his *Axis* in 1 Minute; his Rotation being ſwifter than his Progreſſion.

He is above 1000 Times bigger than our Earth; his Circumference being 254 *Thouſand* and about 470 Miles, or more than 10 *Times* the Earth's Circumference.

He turns round his *Axis* in 9 *Hours* 56 *Minutes*; being the Length of his Day and Night in our Time.

His Orbit is plainly without the Earth's Orbit; becauſe he is ſeen in *Oppoſition* to the Sun; and always with a full illuminated Face. And his diurnal Revolution is very viſible, by a remarkable *Spot* on his Face.

JUPITER's BELTS.

Jupiter is ſurrounded with what are called *Belts*, being *thin Subſtances*, putting on many Changes; on which Account they are deem'd to be *Clouds*; ſome of which being interrupted or broken, have entirely vaniſhed. They ſometimes appear of different Breadths, and then become nearly of the ſame Breadth. Large *Spots* are ſeen in theſe *Belts*; and, at the vaniſhing of a *Belt*, the contiguous Spots diſappear alſo.

The *Axis* of *Jupiter* is ſo little different from being perpendicular to his Orbit, that he undergoes very little Change of Seaſons. If his *Axis* had conſiderably inclin'd, then as many Degrees round the Pole, as were equal to that Inclination, would, by Turns, have been dark for about 6 of our Years. And ſince each Degree contains about 706 of our Miles, at a mean Quantity, vaſt Tracts of his Surface muſt have been rendered uninhabitable, by a large Inclination of his Axis with the Ecliptic, (otherwiſe ordered by the Creator) and the more ſo, as none of his 4 *Moons* are ſeen from his Regions about the Poles; unleſs by means of *Refraction*.

From *Jupiter*, the Sun appears about a *twenty eighth* Part as big as he appears to us; and his Light and Heat are diminiſhed in the ſame Proportion: But this Defect of Light is greatly ſupplied by 4 Moons (bigger and leſs than our Earth) going about him; that there is hardly a Part of this Planet, but what is enlightened by more or leſs of theſe Moons; except at his *Poles*; where their Light is not wanted; becauſe the Sun *conſtantly* appears in or near their Horizon, and may be ſeen at both the *Poles* by the Refraction of his vaſt Atmoſphere.

OF JUPITER's MOONS.

Jupiter is attended with 4 *Moons* going round him, in different Periods of Time.

The *Firſt* or neareſt Moon goes round him in about 1 Day 18 Hours and 28 Minutes of our Time; at the Diſtance of 5,66 times *Jupiter*'s half Thickneſs from his Center, or 230 Thouſand Miles.

The *Second* Moon goes round *Jupiter* in 3 Days 13 Hours and about 19 *Minutes*, at the Diſtance of 9 times his half-Thickneſs, or 365 Thouſand Miles.

The *Third* goes round *Jupiter* in 7 Days and 4 Hours, at the Diſtance of 14,38 Times his *Radius*, or half-Thickneſs, 584 *Thouſand* Miles.

The *Fourth* goes round *Jupiter*, in 16 Days 18 Hours and about 5 Minutes, at the Diſtance of 25,3 Times his *Radius*, or Half-Thickneſs, or 1 *Million* of Miles.

Jupiter ſeen from his neareſt Moon appears 1000 times larger than our Moon, in all her monthly Shapes, every 42½ Hours.

Theſe *Moons* are eclipſed by *Jupiter*'s Shadow in every Revolution they make; by which Eclipſes Aſtronomers have diſcovered that *Light* comes from the Sun to us in 8 *Min.* 13 *Sec.* of our Time, who have, by thoſe Eclipſes, determined the Longitudes of Places on our Earth with greater Certainty and Accuracy than by any other Method.

Jupiter's Orbit is inclin'd to the *Ecliptic* 1 Degree 20 Minutes. His Aſcending *Node* is in 8 Degrees of *Cancer*; and Deſcending One in as much in *Capricorn*, in 1760 Beginning; and the Quantity of Light afforded to *Jupiter*, is about 1 *twenty-eighth* Part of what is afforded to us; except what Light is increaſed by his 4 *Moons*, from Reflection. Though it is certain, that the Revolutions of all *Jupiter*'s Moons are, in Reality, ſo equable, that a *careful Obſerver* of them may exactly *foretel* the Minute when any one of them will be hid behind *Jupiter*'s Body, or paſs betwixt us and his Body: yet, when the Earth is in the Part of her Orbit, the furtheſt from *Jupiter*, it is always found, that thoſe Eclipſes of his Moons happen conſiderably later than the true Time of *Occultation*; occaſioned by the Light taking up ſo many more Minutes in its Paſſage from *Jupiter* to us, at his *furtheſt* than at his *neareſt* Diſtance. *Aſtronomers* finding that *Light* is about 7 or 8 Minutes in its Paſſage from the *Sun* to our Earth, being after the *Rate* of above ten Millions of Miles in a Minute, or about 50 or 60 Thouſand Miles, while you can pronounce the Word *Light*; therefore if a Cannon-Ball continued to move at the Rate of 8 Miles per Minute, it would ſpend about 19 Years and a Quarter, in coming from the Sun to us; and a Body only moving with the Swiftneſs of a *Horſe* or a *Ship*, would take up as many *Ages* in paſſing over the like Space.

☞ *It is by the Difference of the Time of ſeeing the Eclipſes of* Jupiter's *Moons at different Parts of the Earth, that the Difference of Longitude of thoſe Places are determined: For which Purpoſe we have inſerted the Times of thoſe Eclipſes, happening at* Greenwich-Obſervatory, *in Tables further on, computed from a* correct Theory, *for the Uſe of Navigators, in obſerving thoſe Eclipſes under a diſtant Meridian, at Sea, by means of a new invented* CHAIR, *ſuſpended perpendicularly in the Ship, from which to take Obſervation, without the Obſerver being affected by the Ship's Motion.*

Such a Chair, we are told, (beſides that compleated by Mr. *Irwin*) is about compleating at Mr. *Siſſon*'s, in the *Strand, London.*

OF SATURN.

VI. SATURN, the *remoteſt* of all the Planetary *Bodies* in our *Syſtem*, at the Diſtance of about 777 *Millions* of Miles from the Sun, goes round him in 29 Years 158 Days 13 Hours and about 15 Minutes; but (the Earth, the *ſwifter* Body, moving the while) he returns in *Conjunction* with the Sun in 1 *Year* 13 *Days* 2 *Hours* and about 6 *Minutes*, according to the Difference of Motion of the *Earth* and *Saturn*. He travels at the Rate of 315 Miles in a Minute, along his Orbit; but his Motion *per* Minute round his *Axis* is unknown. He is about 600 Times bigger than our Earth, and is ſurrounded by a thin broad Ring, as a Globe is ſurrounded by its Horizon; appearing *double* thro' a *Teleſcope*. It is inclin'd about 30 *Degrees* to the Earth's Ecliptic and is about 21 *Thouſand* Miles in Breadth; being equal to it's Diſtance from *Saturn*, every where.

This amazing *Ring*, whether a Diſruption from *Saturn*'s Body, or original Appendage, appears to turn round its *Axis*; becauſe when it is edgewiſe to us, it is ſeen thicker on one Side of *Saturn* than on the other; and the thickeſt Edge has been ſeen, at different Times, on different Sides thereof. This *Ring* diſappears twice in every annual Revolution of *Saturn*, *viz.* when he is in about 19 Degrees of *Piſces* and *Virgo*, when the Edge is turn'd towards us; and appears broadeſt when *Saturn* is in the Middle, between theſe two *Points*. By which *Saturn* has no viſible Spots on his Body, to determine the Time of his *Rotation*, or Length of his Days and Nights, which are unknown to us.

The *Inclination* of his Orbit to the Ecliptic is about 2½ *Degrees*, and his North *Node* in about 21 Degrees 23 Minutes of *Cancer*, and South *Node* as much in *Capricorn* in 1760, beginning; being but about 13 *Degrees* from the *Nodes* of *Jupiter*.

The Light and Heat afforded by the Sun to this *Planet* is about the *ninetieth* Part of what our Earth enjoys; but by the Reflection of Light from his *Ring*, as well as from his 5 Moons, attending him, his Light is greatly encreaſed, as appears by his *Splendor* in the Night. And the Soil of this *Planet* may contribute to the Encreaſe of Heat by its Retention thereof; tho' at ſo vaſt a Diſtance from the Sun. The Inhabitants of *Saturn* may be ſo adapted to his Climate, as to receive Enjoyments, or Happineſs in this their remote Situation; to whom the Sun muſt appear, if their Eyes are like ours, 100 times leſs than to us; or about twice as big as *Venus* appears, when ſhe is at the brighteſt.

The warmeſt *Region* in this Planet muſt be colder than in *Greenland*, if there is no Proviſion for encreaſing it, at that Diſtance from the Sun. If our Earth was ſo remotely ſituated as *Saturn*, all its *Fluids* upon it muſt be turn'd to *Ice*, as they are under our Poles; without a Poſſibility of ever returning to their original State, but by the Means of Fire.

Neither *Mercury*, *Venus*, the *Earth*, *Moon*, or *Mars* can be ſeen from *Saturn* by ſuch Eyes as ours, without the Aſſiſtance of Glaſſes; only *Jupiter* and the *Sun* can be beheld from *Saturn*; and only *Saturn* and the *Sun* from *Jupiter*, with the naked Eye.

OF SATURN's FIVE MOONS.

The 5 MOONS conſtantly going round *Saturn* to encreaſe his Light, perform their Revolutions as follow.

The *Firſt Moon* goes round *Saturn* in 1 Day 21 Hours and about 18 Minutes, at the Diſtance of about 140 *Thouſand* Miles from his Center.

The *Second Moon* goes round him in 2 Days 17 Hours and about 41 Minutes, at the Diſtance of about 187 *Thouſand* Miles.

The *Third*, in 4 Days 12 Hours and about 25 Minutes, at the Diſtance of 263 *Thouſand* Miles.

The *Fourth*, in 15 Days 22 Hours and about 41 Minutes, at the Diſtance of 600 *Thouſand* Miles.

The *Fifth*, or outermoſt, in 19 Days 7 Hours and about 48 Minutes, at 1 Million and about 800 *Thouſand* Miles Diſtance from *Saturn*'s Center.

The *Attendance* of theſe 5, and the former 4 Moons, on their reſpective great Bodies of *Saturn* and *Jupiter*, are Indications of thoſe Planets being inhabited; or to what Purpoſe ſhould ſo many Moons be created to give Light to ſuch vaſt Bodies, if not for the Accommodation of their Inhabitants? And the further that Bodies are placed from the Sun, and conſequently the more they are deprived of his *direct* Light, we find the greater is the Number of their attending Moons, to ſupply their Light by Reflection; an Indication of a Proviſion for the greater Number of Inhabitants.

By the Earth continuing to move forward in her inferior Orbit, while the ſuperior Planets, of *Mars*, *Jupiter*, and *Saturn*, go forward the ſame Way, in their reſpective Orbits, from Weſt to Eaſt, they will appear as we ſee them, ſometimes *direct*, *ſtationary*, or *retrogade*. Theſe Appearances are a Proof that the Motions of *planetary Bodies* in our ſolar Syſtem are as we admit them, according to the *Newtonian* Philoſophy; exemplified and confirm'd by an *Orrery*.

The Appearances above mentioned are only ſeen thro' a *Teleſcope*; by which you may view the Moon, at 240 *Thouſand* Miles Diſtance, magnified as ſhe would appear to a naked Eye at the Diſtance of 200 *Miles*.

The *Earth*, where an Obſervator of the Heavens is plac'd, being not the Center of our Syſtem of planetary Bodies, they in Conſequence muſt come nearer to, and farther from us, at different Times, by which Means the *Faces* of our Planets appear *bigger* and *leſs* to us, by Turns.

Mercury appears 5½ times bigger at his *leaſt* than at his *greateſt* Diſtance; *Venus* at her leaſt Diſtance, 32 times as big; *Mars* at his, 25 times; *Jupiter* at his, more than twice as big; and *Saturn* only half as much bigger, at his leaſt, than greateſt Diſtance. But *Venus* and *Mercury* are never ſeen when they are *neareſt* the Earth; except when they paſs *directly* between the Earth and Sun; which very ſeldom happens. Hence the *apparent Bulk* of the planetary Bodies of our Syſtem is no certain *Rule* to know them by.

OF COMETS.

COMETS, (partly deſcribed in former *Palladiums*) are *ſtupendous* Bodies, of different *Denſities*, like the *Planets*, revolving round the Sun, as their common Center, in ſuch very elliptical or eccentric Orbits, that they never appear to us, but in that Part of their Orbit when they deſcend near the Sun; from whence, after having paſſed their neareſt Diſtance to him, called the *Perihelion*, with the greateſt Velocity, they aſcend, on the contrary Side of their Orbits, running out into their furtheſt Diſtances from the Sun, beyond the Orbit of *Saturn*, where their Motion is hardly ſenſible. Their Orbits, in general, are acroſs the Heavens, in all Directions; whereas the planetary Orbits only go from *Weſt* to *Eaſt*; and by the Orbits of the *Comets* never coinciding with, or going near the Directions of the *planetary* Orbits, all the *Comets* circulate freely, without giving Interruption to the *Planets*, or being by them interrupted; except by deſcending into the Neighbourhood of the Planets with their greateſt *Velocity*; their *mutual Attractions* may a little diſturb each other: But by the Creator's ballancing and proportioning the two Forces of *Attraction* and *Projection*, call'd the *centripetal* and *centrifugal* Forces, the whole *Machine* of our Syſtem (and each Syſtem of the Univerſe) performs its Motions in regular Order.

That there is an *Attraction* in all material *Subſtances*, ſtronger or weaker, in a certain Proportion to their Bulk and Diſtances from one another, is made evident to Sight; for if you place, in the Middle of the Surface of a Veſſel full of Water, a Number of *ſmall Pieces* of *Cork*, *Wood* or other floating *Subſtance*, at ſmall Diſtances from one another, the neareſt in *Bulk* and Diſtance will firſt come together, and then the next neareſt; and you will ſee the *larger Pieces* attract the *ſmaller* more than the ſmaller attract each other; till by the joint Attraction of the ſeveral Pieces, the largeſt of all will bring the ſeveral leſs together about it; which largeſt Piece will further manifeſt the *Virtue* of Attraction in Matter, by drawing the leſs Pieces after it, if you move it from them.

But the *Projection* of a *Cannon-Ball*, drawn from its rectilinear Motion to a Curve concave towards the Earth, by its *Attraction*, explains, in the moſt familiar Manner, how leſs Bodies, put in ſufficient Motion, are made to revolve round the Centers of the greater attracting Bodies; for there is Nothing more required to make a Body revolve, than to give a ſufficient Impulſe, or Force to make it move forward, with a given Celerity, in a given Time, within the Influence of an attracting Body. And could a ſufficient Velocity be given to a *Cannon-Ball*, to ballance with the Force of the Earth's *Attraction*, that neither Force might prevail, the Ball would revolve. For we ſee the Motions of all the great Bodies of the Univerſe, regulated by the too ſimple Principles of *Projection* and Attraction. Upon theſe *two Principles*, the nearer to, or further from the *Centers of Attraction*, the revolving Bodies move, in their reſpective Orbits, the greater or leſs is their reſpective Velocities. And our Moon, and all the Satellites of *Jupiter* and *Saturn*, as well as their Primaries, are retained in their reſpective Orbits, by the two Principles aforeſaid. On the contrary, if the Attraction once prevailed over the projectile Force, or the Centripetal over the Centrifugal Power, then all Bodies in this Syſtem would deſcend to the Sun, as the Source of Attraction. The *Comets* in their vaſtly *eccentric Orbits*, alſo revolve round this great LUMINARY, turning round him as Racers about their *Goal*.

The *Comets* muſt be of greater *Denſity* than any known Subſtance, ſince the *Heat* they undergo, in every Approach they make to the Sun is ſuch as would *melt, vitrify*, or *diſſipate* any known Subſtance upon Earth.

The Heat of Bodies computed at a given Diſtance from the Sun, is as the *Square* of thoſe Diſtances inverſely; tho' Sir *Iſaac Newton* computed the Heat of the *Comet* which appeared in 1680, by approaching the Sun, to be 2 *Thouſand* times hotter than a red-hot Iron, and that a Body as big as our Earth (to which Comets are little inferior) thoroughly heated would not cool in leſs than 50 *Thouſand* Years, according to the Experiments he made of heated Iron Balls, of given Diameters, yet we may conclude that *Comets*, in paſſing to and from their *Perihelions*, are never heated but *ſuperficially*, and not to their Centers.

Aſtronomers reckon about 21 *Comets* belonging to our *ſolar Syſtem*, moving in all Sorts of Directions. Thoſe which have been obſerved freely paſſed thro the etherial Regions and the Orbits of the Planets, without ſuffering any Impediment.

The *Periods* of the 3 Comets only are yet determined. The *Firſt*, of 75, and 76 Years, alternately, appearing in 1531, 1607, 1682, and 1758. The *Second*, of 129 Years; appearing in 1532, and 1661, and is expected to appear in 1789. The *Third*, of 575 Years, having laſt appeared in 1680, and may be expected in 2235. This laſt *Comet*, from its Orbit's Dimenſions, is about 11 *Thouſand* two Hundred Millions of Miles from the Sun, as its *greateſt Diſtance*; and at it's *leaſt* Diſtance from the Sun's Center, is within leſs than a third Part of the Sun's Half-Thickneſs, or Semidiameter from his Surface; being about 490 *Thouſand* Miles. In that Part of its Orbit therefore, which is neareſt to the Sun, the *amazing* Velocity of it's Motion is not leſs than 14 *Thouſand* 666 Miles in 1 *Minute* of our Time. The Sun, as ſeen from it, appears to be about 100 Degrees in Breadth to ſuch Eyes as ours, and conſequently appears 187 times broader than to us: And, at the greateſt Diſtance of this *Comet* from the *Sun*, where it ſcarcely moves at all, the Sun is *diminiſhed* ſo as to appear from thence but a little brighter and larger than the *Dog-ſtar* appears to us.

The *Comets* all differ from the *Planets* in their *Aſpects*, looking duſky and gloomy, as if ſurrounded with vaſt Atmoſpheres. They project behind them towards that Part of the Heavens oppoſite to the Sun, a *prodigious* miſty Stream or lucid *Vapour*, call'd their *Tails*; ſuppos'd to be the Atmoſphere of the Comet, rarified to a great Degree, in its Approach to the Sun; enlarging and diminiſhing its Dimenſions as the Comet approaches to, and recedes from its Perihelion, or *neareſt Diſtance* to the Sun. The *Tail* of the Comet of 1680, extended itſelf over 60 Degrees, or a *third Part* of the Heavens, from *Eaſt* to *Weſt*, which Tail therefore muſt be ſome *Millions* of Miles in Length.

As to the *Deſtination* or Purpoſe of Comets, whether they were Worlds formerly inhabited, and reduced to a *Chaos*, or whether they are future Worlds not yet reduc'd to a habitable State, or whether they are Maſſes of Combuſtible Matter made to move *periodically* round the Sun, for the Conveyance of *Heat* and *Light* to remote and dark Regions, and after a Number of Revolutions, (approaching every Revolution nearer and nearer, as it is ſuppoſed ſome of them do) they at laſt drop into the

un,

Sun, to ſupply his exhauſted *Fuel*, and continual Waſte of his Heat and Light; or whether they are deſigned to impregnate the Regions of the *Planets* with ſalutary *Particles*, and make up the Decay or Waſte of thoſe Elementary Principles; or whether they are form'd to bring about *Deluges* or *Conflagrations*, or to put a Period to, or produce a Change in other Worlds, is not eaſy to determine. But the *extreme* Viciſſitudes the *Comet Inhabitants* undergo, of Heat and Cold, (and ſuch thoſe Inhabitants may be adapted to endure) with the Opportunity they have of ſeeing the Works of Creation in ſuch Variety of *Views*, and Appearances (in travelling from the fartheſt to the *neareſt* Part of their Orbits in reſpect to the Sun) muſt be as aſtoniſhing as unſpeakably magnificent!

Some Comets, and particularly that of 1680, are computed to proceed in their greateſt Diſtances from the Sun, no leſs than 4 Times the Diſtance of *Saturn*. Yet 'tis found that Comets at that amazing Diſtance, in the *etherial* Pace, are not affected by the Attraction of the *fix'd Stars*; but arriving at their *Extreme Limits*, to which their projectile Force will carry them, they regularly return, by the Force of the Sun's Attraction, acquiring new projectile Force, by accelerating their Velocities all the Way back in their Approach to the Sun; and then retard their Motion in their Retreat every where from Him; and ſo on *periodically*, and perpetually.

We may therefore obſerve, that there is a Space, of 6 or 7 *Thouſand* Millions of Miles over, at leaſt, (and who can tell how much more?) wherein the *Planets* and Comets revolve round the Sun, at the Center of that Space, independent of the Attraction of the *fix'd Stars*, reaching in all Probability, like our Sun's Attraction, 3 or 4 Thouſand Millions of Miles, round each Star. And we may reaſonably ſuppoſe, that there are infinite Syſtems in the infinite Space, and a *fix'd Star* plac'd in the Midſt of each Syſtem, as a *Sun*, to the reſpective revolving Bodies; and all theſe Syſtems kept in Suſpenſion, and at due Diſtances from each other, by certain PROPERTIES.

HENCE, we may ſuppoſe that no two *fix'd Stars* are nearer to each other than 6 *Thouſand Millions* of Miles, however they appear to us ſo crowded, and near one another, at their vaſt Diſtance. For though we are nearer ſome of them at one Time of the Year than another, by the whole Breadth of the Earth's Orbit, or about 160 *Millions* of Miles, their *Appearances*, *Magnitudes*, and *Diſtances*, from one another, are ſeen to be always the ſame.

And, if the Diſtance of 160 *Millions* of Miles is allowed to bear no greater Proportion to the Diſtance of the *fix'd Stars* than one *Pace* or Yard does to *ten* Miles, they may be plac'd, on this Suppoſition, at no leſs Diſtance from us than 10 *Thouſand* Times the Breadth of the Earth's Orbit; that is, 1,600,000,000,000, Miles; making *one Thouſand Times one Thouſand Millions*, beſides 6 *Hundred Thouſand Millions* of Miles.

And, if we further conſider the *immenſe* Diſtance of the *fix'd Stars*, and their Magnitude, to be viſible to us at that Diſtance, it cannot *rationally* be ſuppoſed, that ſuch a Profuſion of *Luminaries* were created by the Divine Wiſdom (that does Nothing in vain) only to afford us a glimmering Light in the Night; which had been more *effectually* beſtow'd, ſtow'd, and with infinitely leſs Exertion of creating Power, by the Addition of one *Moon*. Therefore, in all Probability, or rather without all Doubt, theſe *ſtupendous Luminaries*, ſtrew'd all over the infinite Expanſe, were purpoſely created to enlighten *innumerable Syſtems* of Worlds, revolving round them, as our Earth, and the other Planets, revolve round the Sun. And, if every one of the *fix'd Stars* is a Sun to a *New Syſtem* of revolving Bodies, it is probable that each of thoſe *Syſtems* take up nearly as much Space as our Syſtem: For, why ſhould we ſuppoſe a greater Space allow'd to our Syſtem than to Others, or more Space than is neceſſary?

And, as to the Number of *fix'd Stars* viſible to the naked Eye, amounting but to about 3 *Thouſand* in the lateſt *Catalogues*, on all Sides of the Heavens, if we have Recourſes to *Teleſcopes*, the Number of the Stars will become next to infinite: for we diſcover a greater or leſs Number in each *Conſtellation*, according as the *Teleſcope* we uſe for that Purpoſe, magnifies a greater or leſs Number of Times.

In the *Pleiades*, or ſeven Stars, large *Teleſcopes* diſcover 3 or 4 Score; in *Orion*, where the naked Eye diſcovers not above 40 or 50, an excellent *Teleſcope* will diſcover a *Thouſand*. In the Conſtellation of *Perſeus*, there are more Stars to be ſeen with a Teleſcope than with the naked Eye in the *whole Heavens*.

In the *Galaxy*, or Milky Way, encircling the whole Concave of the Heavens, for the Breadth of ſeveral Degrees, it is probable the Number of Stars are immenſe. Whoſe blended Light cauſes ſuch Confuſion of Brightneſs, in that Part of the Heavens, and being at ſo vaſt a Diſtance, no ſingle Star can be diſtinguiſh'd: as *Milton* deſcribes it, this Part of the Heavens is *powder'd with Stars*.

And hence the Different Magnitudes of Stars, as they appear to us, are probably owing to their vaſtly different Diſtances, they are from us, as plac'd in the Heavens; from thoſe appearing the largeſt, the moſt near, to thoſe appearing the ſmalleſt, the moſt remote.

And, if each remote Star, of thoſe innumerable *Myriads* of Luminaries, be (*as 'tis probable*) a Sun, giving Light and Heat to a different Syſtem of *Planets*, *Moons*, and *Comets* going round it; and if all thoſe Planets and Moons be Worlds inhabited by various Orders of Beings, enjoying ſuch Degrees of Happineſs as the Creator of all theſe Worlds has there reſpectively prepar'd for them, we have thence an aſtoniſhing Idea of the Greatneſs of the Creator from his Works.

The Idea of the immenſe THEATRE OF THE UNIVERSE exhibits to us its Fitneſs for the Being of an infinite GOD, (whoſe Exiſtence and Glory exceeds all human Comprehenſion) to diſplay his immenſe Wiſdom, Power, and Goodneſs upon.

But, after having extended the *created Univerſe* to a Space, as far and wide as the greateſt human *Arithmetic* can expreſs, what is that Space to *Infinitude*? but as a mere Point, that bears no Proportion to the unbounded and unlimited Preſence of the Divine Nature? For were the higheſt Archangel to take his Flight from this Part of the Univerſe, and travel in a direct Courſe with the Swiftneſs of *Light*, it is certain, from the Nature of Immenſity, that ſhould he proceed in his Flight to all *Eternity*, he muſt ſtill find himſelf in the Center of the Divine Preſence,

as In

“ *In whom we live and move and have our Being. There is no flying from*
“ *his Preſence. The Heavens, even the Heaven of Heavens cannot contain*
“ *him.*”

☞ The foregoing Syſtem of the World, is not a late or New Invention, but was taught by the famous *Samian* Philoſopher, *Pythagoras*, and other Antients. It was however loſt in the latter Ages of Ignorance 'till the 15th *Century*, when it was reviv'd by the famous *Poliſh* Philoſopher, *Nicolaus Copernicus*, who was born at *Thorn*, in the Year 1473. He was followed by the famous *Kepler*, *Galileo*, *Deſcartes*, *Gaſſendus*, and the ſagacious Sir *Iſaac Newton*. Which laſt great Genius has eſtabliſhed the foregoing Syſtem of Motion, on the everlaſting *Baſis* of mechanical Experiment, and *Mathematical Demonſtration*. Other Syſtems have been invented ſince the *Pythagorean*; as the *Ptolemean* firſt, and then the *Tychonic*; neither of which are worth the *Explanation*, ſince the latter is but partly true, and the former wholly *abſurd*.

OF THE
WISDOM of GOD
IN HIS
MINUTE WORKS of CREATION.

THE CONTRAST.

THE *Microſcope* has open'd to us of theſe latter Ages, a World quite unknown to the *Antients*, who imagined that the whole Race of *Inſects* were produc'd by *Heat* and *Corruption*, and had not the leaſt Suſpicion of the Exiſtence of any living Creature ſmaller than their naked Eyes could perceive. Whereas we find, by the Help of the *Microſcope*, (furniſhing us with an inexhauſtible Variety of Entertainment) that the ſmalleſt *Animalcule*, as well as the largeſt Beaſt of the Field, is produc'd by Parent Animals; and that the different *Species* or Kinds of Living Creatures, whoſe Minuteneſs renders them imperceptible to our naked Eyes, are as numerous as thoſe which are viſible to us, without Glaſſes. By the *Microſcope* we find that the complex and various *Apparatus*, neceſſary to Life, can be crowded into a *Point*; and that an *organiz'd* Body may be put together, whoſe Size is not equal to an *Atom*; and, moreover, that there are innumerable Species of *Animalcules*, which, when magnified a Million of Times, are ſtill hardly diſcernible; that a few Drops of ſome Fluids contain more living Creatures than there are *Men*, *Women* and *Children*, now alive, upon the Face of the whole Earth. And, by the *Microſcope*, we find, that the ſame Hand which, with ſuch wonderful Accuracy, poiſed and ballanced the *Magnitudes*, *Diſtances*, and *Velocities* of thoſe immenſe Bodies, the Planets and Comets, has likewiſe faſhion'd the inconceivably Minute Bodies of *Animalcules*, with ſuch Elegance and Beauty, that the more they are magnified, and the further they are examin'd, the more curious they are found to be: Whereas, on the contrary, the moſt *exquiſite Works* of human Art owe their Beauty to the Imperfection of our Sight. So that the *fineſt Needle* appears through the *Microſcope* like a Plowſhare; a *Piece of Silk* like a Mat; and the moſt delicate *Picture* in Miniature, like a rough *Caſt-Wall.*

The Obſervations of the Wonders of creating Power, in theſe Minute Objects, ſhew us, that He, who inhabits Immenſity and Eternity, is abſolute Maſter of every Point of Space, and of every Particle of Matter in the Univerſe; and *pervades*, *actuates* and *invigorates* all; exhibiting, in an imperceptible Point, as well as in an unbounded Sphere, the Perfections and Attributes of an *infinite God.*

How conſpicuous is the Wiſdom of God, in the Miniature of his Works! There are very few Subſtances in which the *Microſcope* does not diſcover ſomething curious and unexpected. But, for the Satisfaction of ſuch Readers as are unacquainted with the Uſe of that *Inſtrument*, we ſhall here ſet down *Inſtances* of the moſt remarkable and entertaining *Objects*, on which Microſcopic Obſervations have been made.

INSTANCES of the WONDERS of MINUTE OBJECTS.

I. THE *Globules of the Blood, which are computed to be almoſt a two Thouſandth Part of an Inch in Diameter, each conſiſting of* 6 *ſmall Globules, each of which again probably conſiſts of* 6 *ſmaller, and ſo on. The Circulation of the Blood may be ſeen diſtinctly, by Means of the Microſcope, in the Tail of a Fiſh, the Web of the Foot of a Frog,* &c. *and the Globules to ſplit and divide, before they can enter the ſmalleſt Veſſels.*

II. *The Bones of all Creatures, ſlic'd extremely thin, afford an entertaining Object for the Microſcope, conſiſting of innumerable Perforations,* and *Ramifications, diſpos'd in an endleſs Variety of Forms.*

III. *The Fleſh of all Land and Sea Animals, dried and cut into very thin Slices, give a beautiful View of the various Fibres and their Convolutions. The Brain, the Spinal Marrow, and even the Hairs of Animals, exhibit different Curioſities.*

IV. *The human Skin, by the Help of the Microſcope, is found to be cover'd over with an infinite Number of Scales lying over one another, as in Fiſhes; and it is probably the ſame in other Animals. It has been computed that a Grain of Sand will cover two Hundred of theſe Scales.*

V. *All Sorts of Feathers, eſpecially thoſe of the Peacock, afford a ſurprizing View through a Microſcope. It is ſuppoſed that a ſingle Feather contains no leſs than a Million of different Parts.*

VI. *Flies are found by the Microſcope to be produc'd from Eggs laid by the Mothers: from whence they are hatch'd in the Form of Maggots, or ſmall Worms, which are afterwards transformed into Aurelias, and theſe into perfect Flies. This is the Proceſs moſt of the winged Inſects go through in their Production. They have a great Number of Eyes fix'd to their Heads, ſo that they ſee on all Sides around them, without turning their Heads or Eyes. A common Fly is ſuppoſed to have eight Thouſand; and a grey Drone Fly no* *leſs than fourteen Thouſand Eyes, with a diſtinct Optic Nerve to each; and each Eye appears through the Microſcope, though magnified many Hundred Thouſand Times, more exactly ſhaped, and more curiouſly poliſh'd, than human Art could finiſh an Object, as large as the whole Cluſter; containing ſeven Thouſand diſtinct Eyes. The Wings of Flies, eſpecially of the Moth, and Butterfly kind, are found to be contrived with admirable Art, to anſwer their Uſe, and with admirable Beauty and Ornament. The Duſt, which ſticks to the fingers, when we handle them, is found to be Feathers; each of which has its Quill, and Vane Parts as compleat as that of a Fowl or Gooſe; and are inſerted in the Film of the Wing, with the utmoſt Regularity of Arrangement. With the Microſcope the Stings of Moths and Bees appear to be Inſtruments finiſh'd to the higheſt Perfection; their Points, and ſaw-like Teeth, being perfectly poliſhed and ſharp; whereas the Edge of a Razor appears like a Butcher's Cleaver; and the Point of a Launcet like an Iron Spike, juſt come from the Anvil.*

VII. *By the Help of the Microſcope, the innumerable, and inconceivably minute Animalcules in various Fluids, are diſcover'd; of the Exiſtence of which we have no Reaſon to ſuppoſe any Mortal had the leaſt Suſpicion 'till the laſt Century. In the Milt of a ſingle Cod-Fiſh ten times more living Creatures are contain'd than all the Inhabitants of Europe, Aſia, Africa and America; ſuppoſing that all Parts of the World are as well peopled as Holland, which is not the Caſe. Of a certain Species, ſome are diſcover'd ſo extremely minute, that it has been computed that three Millions of them, or three times the Number of Inhabitants of London and Weſtminſter, would not equal the Bulk of a Grain of Sand. Of Animalcules, ſome Species reſemble Tadpoles, Serpents, or Eels, others are of a roundiſh, or oval Form; others of very curiouſly turn'd, and various Shapes. But, in general, they are extremely vigorous and lively, and almoſt conſtantly in Motion. Animalcules are to be found (beſides thoſe in the Bodies of Animals,) in the Infuſions of Pepper, Senna, Pinks, Roſes, Jeſſamin, Tea, Raſberry Stalks, Fennel, Sage, Melons, Sour Grapes, Wheat, Hay, Straw, and almoſt all vegetable Subſtances, in the Water; that is, in the Shells of Oyſters, Cockles, and other Shell Fiſh. In the Foulneſs upon our Teeth, and thoſe of other Animals; in our Skins, when affected with certain Diſeaſes; in Vinegar and Paſte; and ſo on infinitely. In each of theſe Subſtances, when expoſed in the Air, ſome Time, Multitudes of living Creatures, beyond the reach of Numbers, are diſcover'd, of which many Hundreds of Species are already known, as different from one another, as thoſe of the largeſt Animals; and very probably, there are many more yet unknown. And ſo it is certain, that in the foremention'd Fluids, few or no Animalcules are to be found when cover'd from the Air, but when open to the Acceſs of Air, their Numbers are beyond reckoning. Therefore it is hardly to be doubted but either the Air is replete with infinite Multitudes of living Creatures, too ſmall for Sight, which come and depoſit their Eggs in Places proper for the Nutrition of their Young, or that their Eggs are floating, every where in the Air, and falling promiſcuouſly every where, only thoſe are hatch'd, or come to Perfection, which fall upon Places fitted for them; and the others periſh. However it be, the countleſs Numbers of thoſe living Creatures, the Profuſion of Life every where to be obſerved, is above meaſure aſtoniſhing; and ſhews the Maker to be an infinite Being.*

VIII. *By the Help of the Microſcope, we find that the Scales of almoſt every different Fiſh are different from thoſe of others, in internal Texture; and that all of them are wrought with ſurprizing Art and Beauty.*

IX. *By Means of this noble Inſtrument, we find, that the Seeds of almoſt all manner of Vegetables contain in them the Stamina of the future Plant, or Tree, and that their Production from the Seed, and their Growth to Maturity, is only the ſwelling and enlarging of the Stamina, by the Addition of nutricious Juice. It is probable the manner of Production and Growth of Animals is analagous to this. The Fertility of ſome Plants is almoſt beyond Belief. One Plant particularly is ſaid, by Naturaliſts, to produce, annually, a Million of Seeds from one. The Farina of Flowers is found, by the Help of the Microſcope, to be a regular organiz'd Body; and not a mere Duſt, as it appears to the naked Eye; and is reaſonably ſuppoſed to be neceſſary to Fertility, in Plants and Trees.*

X. *By the* Microſcope *have been diſcovered many ſingular Properties of that* moſt unnacountable of all Creatures, *the* Polype, *which is found at the Bottom of Ditches, and ſtanding Water; whoſe Manner of* Production, Feeding, *and* Digeſtion, *are different from thoſe of all other Animals. The* young *Ones come out of the Sides of the old, like Buds and Branches from Trees, and at length drop off perfect* Polypes. *They do not ſeem to be of different Sexes; they take in* Worms *and other Subſtance, by Means of a Set of long Arms, or* Antennæ, *which ſurround their Mouths, and after keeping them ſome Time in their Stomachs, throw them out again the ſame Way. The Animal's Body conſiſts of a ſingle Cavity, like a* Tube or Gut; *and what is wonderful, and almoſt beyond Belief, is, that it will live and feed after it is turn'd Inſide out; and even when cut into a great many Pieces, each ſeveral becoming a complete* Polype. *They are infeſted with a Kind of Vermin, as are almoſt all Animals, from the largeſt down to* Bees, *and other Inſects. Theſe Vermin ſometimes in a long Time, will eat up the* Head, *and Part of the* Body *of a* Polype, *after which if it be cleared of them, the devour'd Part will grow up again, and become as complete as ever. Some* Polypes *have, around their Mouths, a Sort of Plume, which they whirl round, and making with it an* Eddy, *in the Water, draw in their* Prey, *and devour it.*

XI. *By the* Microſcope, *it is found, that neither the* Wood, *the* Bark, *the* Root, *the* Leaves, *the* Fruit, *nor even the* Pith *of the meaneſt Vegetable is a Maſs of crude or undigeſted Matter; but that every different* Species *is different in its internal Structure, and all curiouſly and delicately wrought. A Bit of* Cork *cut extremely thin, a Slice of* Oak *or* Fir, *or a Bit of* Elder Pith, *in the* Microſcope, *are ſo many curious Pieces of* Moſaick *Work. Even a Bit of* Charcoal *or burnt Wood, appears thro' the* Microſcope *an admirable Object.*

XII. *By this* Inſtrument, *it is found, that what we call* Mouldineſs *upon* Fleſh, Leather, *or other Subſtances, is no other than a great Number of extremely ſmall, but perfect Plants; having Stalks and Tops like Muſhrooms; and ſometimes an Appearance of* Leaves. *The Seeds of theſe minute Plants muſt, in all Probability, be diffus'd,* univerſally, *thro' the Air, and falling upon a Subſtance fit for their Growth, ſpring up in aſtoniſhing Profuſion. There is, in ſhort, no End of* microſcopic Objects. *A Sprig of* Moſs, *by the Help of that* Inſtrument, *is found to be a re-*

a regular Plant, *conſiſting of a* Root, *a* Stock, Branches, Leaves, &c. *And* Naturaliſts *tell us, there are ſome Hundreds of different* Species *of It.* *A Bit of* Spunge *viewed by the* Microſcope, *appears to be a curious Piece of Work.* *Every different* chemical Salt *has its Parts differently figured.* *A Leaf of a common* ſtinging Nettle, *the Beard of a* wild Oat, *the Surface of ſome* Pebble Stones, *a Flake of* Snow, *a few Grains of* Sand, *or almoſt any natural Production, by Means of the* Microſcope, *exhibit exquiſite Beauties: While, on the contrary, the moſt delicate Works of Art can by no means bear its Examination; but degenerates before its View, into Maſſes of Irregularity, and* Deformity.

Thus far have we ſeen a few of the innumerable Inſtances *of the moſt conſummate Wiſdom of the* SUPREME BEING, *in the Contrivance of his* Works of Creation. *That even the* minuteſt *Part of his Works is wiſely contrived to anſwer its proper Uſe and End; while it anſwers various other, and ſeemingly contrary, Ends, at the ſame Time; ſo as to become a* neceſſary *Member of the immenſe Whole.*

HENCE we have ſeen, from the ſlight View we have taken of the *Divine Works,* from the moſt amazingly *huge,* to the moſt *minute* Bodies, that the *great Author* of them is wiſe above all finite Comprehenſion! And if Men are not aſtoniſhed and ſtarted at the *amazing* Effects of the *Divine Power,* in the curiouſly contrived Motions of thoſe unweildy and ſtupendous Bodies, the *Planets* and *Comets,* revolving with ſuch prodigious Velocities, and in ſuch admirable Order, it muſt be becauſe they have not attentively conſidered them; or becauſe they have not been made acquainted with their *adequate Ideas.*

THE laſt INSTANCE we ſhall give of the *Power* of the ADORABLE CREATOR, from his ſtupendous Works, is in the aſtoniſhing and violent Effects of *Earthquakes,* as terrible and as deſtructive to human Safety and Happineſs, as the violent *Effects of War,* in the human Government of Affairs. Therefore we here preſent ſuch of our Readers as are not acquainted with this Part of *natural* Philoſophy, with the *ſuppos'd Cauſes* of Earthquakes.

The Earth abounding, univerſally, with *Caverns* and ſubterraneous Paſſages, and its Entrails being filled with great Quantities of *inflammable Matter,* it is no Wonder, that on the ſame *accidentally* taking Fire, and ſuddenly rarifying the Air and Vapours, that are pent up, in thoſe unſeen Regions, ſhould produce the ſame Effect as Gunpowder in blowing up a Mine. There are ſeveral Sorts of *Subſtances,* which being kept aſunder are cool and peaceable; but being put together, break out, ſome *inſtantly,* ſome more *ſlowly,* into Heat, Smoke, Fire and Flame! And an *artificial Earthquake* may be produc'd by burying under Ground a Quantity of *Paſte,* made of *Sulphur* and Filings of *Steel,* which in a few Hours will *ſwell and heave up the Ground,* and at laſt break out into Smoke and Flame.

Volcanos, or burning Mountains, are generally found in thoſe Parts of the World which are ſubject to *Earthquakes;* being the Vents or *Spiracles* of the inflamable Matter, which cauſes them; of which ſuch Quantities have been thrown out of Mount *Etna,* and other *Volcanos,* as are aſtoniſhing to think of.

Of the moſt terrible Earthquakes that have happened, that in *Sicily* in the Year 1692-3, deſtroy'd and greatly damag'd *fifty four* Cities and Towns, beſides a great Number of Villages; particularly the City of *Catanea*, in which, of 18 *Thouſand* 914 Inhabitants, 18 *Thouſand* were ſwept to one Grave in a Moment, and never more ſeen. In that whole *Iſland* about 60 Thouſand periſh'd of 244 Thouſand 900 People. In *Jamaica*, where Earthquakes are very frequent and dreadful, one happen'd in the Year 1692, which in two Minutes ſwallowed up nine Tenths of the Town of *Port-Royal*. The Earth opening, ſwallow'd People up in *Crowds*, ſome of whom were thrown up in other Places; ſome were preſs'd to Death by the cloſing Earth, with their Heads left above Ground, which the Dogs prey'd upon before they could be got out and buried. Whole Plantations were a great Way removed from their firſt Seats; and *Ships* in the Harbour were overſet and loſt, and ſome thrown far upon the dry Land. The Earth rolled like Waves of the Sea; and, at its Openings, *Rivers* of Water ſpouted up. The whole *Scene* was attended with *horrible Noiſes!* as of falling Mountains at a Diſtance; and with an inſufferable *Stench*; while the Vapours, which broke out, darken'd the Air. *Mountains* were puſh'd out of their Places, and ſtopp'd the Courſe of Rivers. Almoſt all the Houſes in the *Iſland* were thrown down, and a Thouſand Acres of Land ſunk outright. Of which *Ruins* the Author of this *Palladium* has been an Eye Witneſs.

At *Lima*, in *Peru*, 5 Thouſand People periſh'd by an Earthquake in 1687; beſides many loſt by a terrible one a few Years ago. There have been alſo terrible Earthquakes in *New England*, *Liſbon*, and other *Places*, (beſides the Shocks felt in this Nation, on *March* 8, 1750 and before) too tedious to mention. *See an ingenious Production, entitled an Idea of the Creator from his Works.*

If Plagues and Earthquakes break not Heaven's Deſign,
Why then a Borgia *or a* Cataline?

Pope's Eſſay on Man.

☞ *For want of Room we are obliged to poſtpone our Military Materials, and the Subjects of War and Government, 'till future Palladiums.*

The ROYAL CHRONOLOGER *for the* YEAR 1760: *Being a* MEMORANDUM *of the* Holidays, Birth-days, remarkable Days, &c,

CHRONOLOGICAL NOTES for 1760.

Dominical Letter, N. S.	FE	*Sexageſima*	10
Old Stile	BA	*Quinqua.* or *Shrove-Sunday*	17
Golden Number	13	*Aſh-Wedneſday*	20
Cycle of the Sun	6	*Quadrageſima, or* 1*ſt Sunday in Lent*	Feb. 24
Indiction	8		
Epact	12	*Palm Sunday*	Mar. 30
Septuageſima Sunday	Feb. 3	EASTER	Apr. 6

Low

Low Sunday	Apr. 13	EMBER DAYS.
Rogation	May 11	Feb. 27, 29, Mar. 1
Aſcenſion-Day	15	May 28, 30, 31.
Whitſunday	25	Sep. 17, 19, 20.
Trinity-Sunday	June 1	Dec. 17, 19, 20.
Advent	*Nov.* 30	

HOLIDAYS kept at

The EXCHEQUER, STAMP-OFFICE, EXCISE-OFFICE, || CUSTOM-HOUSE, and SOUTH-SEA-HOUSE.

For 1760.

Ms.	D.	Holidays.	Ms.	D.	Holidays.
Jan.	1	Circumciſion	*July*	15	St. Swithin.
	25	St. Paul.		25	St. James.
	30	K. Charles I. Mart.	*Aug.*	1	Lammas Day.
Feb.	2	Purif. V. Mary.		24	St. Barthol.
	19	Shrove Tueſday.	*Sept.*	2	Lond. burnt.
	20	Aſh Wedneſday		14	Holy Rood.
Mar.	1	St. David.		21	St. Matthew.
	25	Lady-day.	*Octo.*	18	St. Luke.
Apr.	4	Good Friday.		22	K. Geo. II. crown'd
	7	Eaſter Monday.		28	St. Sim. and Jude.
	8	Eaſter Tueſday.	*Nov.*	1	All Saints.
	9	Eaſter Wedneſday.		2	Prs. Or. born.
	23	St. George.		5	Powder Plot.
	25	St. Mark.		9	Ld. Mayor's Day.
	26	Duke Cumb. born.		10	K. Geo. II. Birth-day kept.
May	1	St. Philip and James.		28	Q. Eliz. Acceſſ.
	15	Aſcenſion Day.		30	Prs. Dow. Wal. born.
	27	Whit-Tueſday.	*Dec.*	21	St. Thomas.
	28	Whit-Wedneſday.		25	Chriſtmas Day.
	29	K. Char. II. Reſtor.		26	St. Stephen.
June	4	Geo. P. of *Wal.* born.		27	St. John.
	11	St. Barnabas.		28	Innocents.
	22	K. Geo. II. Inaug.			
	24	St. John Bap.			
	26	K. Geo. II. proc.			
	29	St. Pet. and Paul.			

N. B. At the *Cuſtom-houſe* there is *no Holiday* on *St. David, Eaſter Wedneſday, Duke of Cumberland's Birth-day, Whitſun-Wedneſday, St. Swithin, Lammas-day, Fire of London,* or *Holy Rood.*

At the *South-Sea-Houſe* there is *no Holiday* on *Valentine, St. David, St. Swithin,* or *Holy Rood.*

ALL the HOLIDAYS and REMARKABLE DAYS for the YEAR 1760.

††† The *Feſtival* marked with * is preceded by a *Vigil* or *Faſt.*

If any of the Feaſt-days marked * fall upon a *Monday,* the Vigi or Faſt muſt be kept on the *Saturday* before, and not on the *Sunday,* which is the greateſt of *Feſtivals.*

JANUARY

January xxxi Days.

1 *Circumciſion.*
4 Sir *Iſaac Newton* born 1643, N. S.
5 Old Chriſtmas Day.
6 *Sun. of Ep.* or *Twelfth Day.*
8 Lucian.
10 *Princeſs Elizabeth* b. 1740
13 1 *Sunday after Epiphany.* Hillary.
14 Oxf. & Camb. Ter. beg.
15 Exchequer opens.
17 Old Twelfth-day.
18 Priſca.
20 2 *Sunday aft. Epiphany.* Fabian. Oct. Hil. 1 ret.
21 Agnes.
22 Vincent.
23 Hillary Term begins.
25 *Converſion of St. Paul.*
27 3 *Sunday after Epiphany* Quind. Hil. 2 ret.
30 K. Cha. II. Mar. 1648-9 O. S. 12 min. paſt One.

February xxix Days.

2 *Purification of B. V. M.* or Candlemas-day.
3 *Septuageſima.* Blaize. 3 ret.
5 Agatha.
9 Oct. Purif. 4 ret.
10 *Sexageſima.* Dies Scholaſtica at Oxford.
12 Hillary Term ends.
13 Old Candlemas Day.
14 Valentine.
17 *Quinqua.* or *Shrove Sund.*
20 Aſh Wedneſday.
21 Camb. Com. for Batch. of Arts.
24 *Quadrageſima,* or 1 *Sunday in Lent.*
27 St. *Matthias.** Ember.
28 Hare-hunting goes out.
29 *Ember.*

March xxxi Days.

1 David, *Ember.*
2 2 *Sunday in Lent.* Cedde or Chad.
5 Prs. *Mary* of *Heſſe* b. 1722.
7 Perpet. Maurit.
9 3 *Sunday in Lent.*
12 Gregory.
16 4 *Sunday in Lent.*
17 St. Patrick.
18 Edw. K. of W. Sax.
19 Princeſs *Louiſa* born 1749. Joſeph.
20 Cuthbert. Eq. Day & N. Camb. lat. Act.
21 Benedict.
23 5 *Sunday in Lent.* or *Paſſ. Sunday.*
25 Annun. *Lady-day* 1 Q. Day. Pr. Edw. b. 1739.
29 Ox. & Cam. Terms end.
30 *Palm Sunday.*

April xxx Days.

1 All Fool's Day.
3 Richard.
4 Ambroſe *Good Friday.*
5 Old Lady-Day.
6 EASTER SUNDAY.
7 *Eaſter Monday.*
8 *Eaſter Tueſday.*
13 1 *Sund. aft. Eaſter,* or *Low-Sunday.*
15 Sun and Clocks together.
16 Ox. and Camb. Term beg.
20 2 *Sund. aft. Eaſt.* 1 ret.
23 Eaſt. Term beg. St. Geo.
25. St. *Mark.*
26 D. of Cumberland b. 1721.
27 3 *Sunday aft. Eaſter.* ret. Vict. of Culloden.

May xxxi Days.

1 St. *Philip* and *James.*
3 Invention of the Croſs.
4 4 *Sund. aft. Eaſter.* 3 ret.
5 Weſtminſter Elect.
6 St. John Ant Port. Lat.
11 5 *Sund. aft. Eaſter,* or *Rogat. Sund.* 4 ret.
12 Old May Day.
12, 13, 14 Rogation Days.
15 Aſcenſion, or Holy Thurſd.
16 ——— Return.

28 6 *Sund. aft. Eaſter.*
19 Dunſtan. Eaſt. Term ends.
22 Ox. and Camb. Terms end.
24 Pr. Fred. Will. b. 1750
25 *Whitſunday.*
26 Auguſtine.
No Night, all Twil.
27 Venerable Bede.
28 Ember.
29 K. *Charles* II's *Nativity and Reſtoration.*
30 Ember.

JUNE xxx Days.

1 *Trinity Sunday.* Nicomedes.
2 *Trinity Monday.*
Trin. Col. Elect. 1 ret.
3 *Trinity Tueſday.*
4 George Prince of Wales born 1738.
Ox. and Camb. Term beg.
5 Boniface. *Corpus Chriſti.*
8 1 *Sund. aft. Trin.* 2 ret.
10 Princeſs Amelia b. 1711.
Princeſs Carolina b. 1713.
11 St. *Barnabas.*
15 2 *Sund. aft. Trin.* 3 ret.
16 Sun and Clocks together.
17 St. Alban.
20 Tranſ. Ed. K. Weſt Sax.
22 3 *Sund. aft. Trin.* K. Geo. II. Inaug. Longeſt Day.
24 St. *John Baptiſt* *
SECOND QUARTER DAY.
25 St John's Coll. Election.
26 K. Geo. II. proclaim'd.
29 4 *Sund. aft. Trin.* St. *Peter.* *
30 Buck Hunting comes in, and continues till Holy Rood. Ex. Col. Elect.

JULY xxxi Days.

1 Camb. Commencement.
2 Viſitation of V. Mary.
3 Dies Comitior.
4 Tranſ. of St. Martin.
5 Old Midſummer Day.
6 5 *Sund. aft. Trin.*
7 Thomas à Becket.
8 *Oxford Act.* 7 days from Camb. Commen. incl.
13 6 *Sund. aft. Trin.*
15 St. Swithin.
20 7 *Sund. aft. Trin.*
Margaret.
22 Mary Magdalen.
Princeſs Carol. Matilda b. 1751
24 Magdalen Col. Elect.
25 St. *James* *
26 St. Anne
27 8 *Sund. aft. Trin.*
30 Dog Days begin.
Sirius riſes with the Sun.

AUGUST xxxi Days.

1 Lammas Day.
3 9 *Sund. aft. Trinity.*
6 Transfiguratio n.
7 Name of Jeſus.
10 10 *Sund. aft. Trin.*
St. Lawrence.
11 Princeſs Auguſta b. 1737.
15 Aſſumption of V. M.
17 11 *Sunday aft. Trin.*
21 Athanaſius.
24 12 *Sund. aft. Trin.*
St. *Bartholomew* *
28 St. Auſtin.
29 Beheading of St. John the Baptiſt.
30 Sun and Clocks together.
31 13 *Sund. aft. Trin.*

SEPTEMBER xxx Days.

1 Giles.
2 London Burnt. 1666. O. S.
7 14 *Sund. aft. Trin.*
Eunurchus.
8 Nativity B. V. M.
9 Dog Days end.
14 15 *Sund. aft. Trin.*
Holy Croſs Day.
17 Lambert. Ember.
19 and 20 Ember.
21 16 *Sund. aft. Trin.*
St *Matthew.*
22 Equal Day and Night in all the World.
26 Cyprian.

28 17 *Sund. aft. Trin.*
Sheriff of London Sworn.
29 St. *Michael.*
THIRD QUARTER DAY.
Hare Hunting comes in, and laſts till the End of February.
30 St. Jerom.

OCTOBER xxxi Days.

1 Remigius B. Rhemes.
5 18 *Sund. aft. Trin.*
6 St. Faith.
9 St. Dennis.
10 Old Michaelmas Day.
Ox. and Camb. Term beg.
12 19 *Sund. aft. Trin.*
13 Tranſ. K. Edw. Confeſſ.
17 Etheldred Virg.
18 St. *Luke.*
19 20 *Sund. aft. Trin.*
22 K. Geo. III. crown'd 1727.
25 Criſpin.
26 21 *Sund. aft. Trin.*
28 St. *Simon and Jude* *

NOVEMBER xxx Days.

1 *All Saints* *
2 22 *Sund. aft Trin.* All Souls.
3 All Souls Coll. Elect. 1 ret.
4 King William born.
5 Powder Plot 1605. Or Sr.
6 Leonard. Mich. Term. beg.
7 Pr. Hen. Fred. b. 1745.
9 23 *Sund. aft. Trin.*
K. Geo. II. b. 1683. N. S.
Lord Mayor's Day, *Lond.*
10 K. Geo. II. Birth Day kept.
11 St. *Martin.*
12 2 return.
13 Britius.
15 Machutus.
16 24 *Sund. aft. Trin.*
17 Hugh. Anniverſary of Q. Eliz. Procl. 1558.
18 3 return.
20 Edmund.
22 Cecilia Old Martinmas Day.
23 25 *Sund. aft. Trin.*
St. Clement.
25 Catherine. 4 ret.
27 Baliol. Col. Elect.
28 Michaelmas Term ends.
30 ADVENT SUNDAY.
St. *Andrew.* * Princeſs Dow. of Wales b. 1719.
Anniverſary Meeting of the Royal Society.

DECEMBER xxxi Days.

4 Barbary.
6 Nicholas.
7 2 *Sund. in Advent.*
8 Conception of B. V. M.
13 Lucy.
14 3 *Sund. in Advent.*
16 O Sapientia.
17 Ox. and Cam. Terms end.
Ember.
18 Princeſs Louiſa, Q. of Denmark b. 1724.
19 and 20 *Ember.*
21 4 *Sund. in Advent.*
St. *Thomas.* Shorteſt Day.
23 Sun and Clocks together.
25 *Chriſtmas Day.* *
4 QUARTER DAY.
Fox Hunting comes in, and laſts till Lady Day.
26 St. *Stephen.*
27 St. John Evangeliſt.
28 1 *Sund. aft. Chriſt.*
Holy Innocents.
31 Sylveſter B. of Rome.

PART of the ROYAL EPHEMERIS, for *Greenwich* OBSERVATORY; 1760.

See towards the END of this WORK for the REST.

NEW, FULL, and QUARTER MOONS.

D.	January.	D.	February.	D.	March.
	h m		h m		h m
2	4 51 A. Full	1	6 24 M. Full	1	9 17 A. Full
10	5 56 M. LaſtQ.	9	3 20 M. Laſt Q.	9	11 55 A. LaſtQ.
18	6 32 M. New	16	6 42 A. New	17	8 3 M. New
25	7 11 M. FirſtQ.	23	3 17 A. Firſt Q.	23	11 48 A. FirſtQ.
				31	1 7 A. Full
D.	April.	D.	May.	D.	June.
	h m		h m		h m
8	5 35 A. LaſtQ.	8	7 21 M. Laſt Q.	6	5 17 A. Laſt Q.
15	5 11 A. New	15	1 5 M. New	13	8 18 M. New
22	7 10 M. FirſtQ	21	7 56 A. Firſt Q.	19	8 33 M. FirſtQ.
30	5 27 M. Full	29	9 26 A. Full	28	0 19 A. Full
D.	July.	D.	Auguſt.	D.	September.
	h m		h m		h m
6	0 16 M. Laſt Q.	4	5 50 M. LaſtQ.	2	11 18 M. LaſtQ.
12	3 53 A. New	11	0 49 M. New	9	11 50 M. New
19	11 37 A. FirſtQ.	18	4 37 A. FirſtQ.	17	11 24 M. FirſtQ.
28	1 27 M. Full	26	1 32 A. Full	25	0 21 M. Full
D.	October.	D.	November.	D.	December.
	h m		h m		h m
1	5 56 A. Laſt Q.	7	7 2 A. New	7	2 8 A. New
9	2 0 M. New	15	11 19 A. FirſtQ.	15	2 13 A. FirſtQ.
17	6 12 M. Firſt Q.	22	9 24 A. Full	22	7 27 M. Full.
24	10 46 M. Full	29	1 59 A. LaſtQ.	29	5 0 M. Laſt Q.
31	2 34 M. Laſt Q.				

Note, A denotes Afternoon; and M, Morning.

NEW ÆNIGMAS.

I. ÆNIGMA 100. By Mr. ISAAC TARRAT of *Epſom*.

1.

YE talk of *Riddles*, here I come,
A moſt accompliſh'd *Rake*;
When young and growing I was dumb,
But now aloud can ſpeak.

2.

A *Linguiſt* near the '*Change* is known
That's Maſter of *Eleven*;
In me the Pow'r of Art is ſhewn,
For I can ſpeak you *Seven*.

3.

Engliſh and *Iriſh*, and broad *Scotch*,
No Stranger at *Turin*;

Italian, *Flemiſh* and *High-Dutch*,
A Favourite at *Berlin*.

4.
When young I wore a Cap of *Green*,
Behold how *Modes* do change;
In *Black* or *Brown* now moſtly ſeen,
What Clime ſoe'er I range.

5.
Old *Argus* had a hundred Eyes,
That ſubtle watchful *Couſin*;
One Truth, pray hear, without Diſguiſe,
I've half a *Baker*'s Dozen.

II. ÆNIGMA, 101. By the ſame GENTLEMAN.

THINK not, fair *Ladies*, I'm a Cheat,
Though I moſt Hands can counterfeit;
Indeed my *Pedigree*'s but low,
For 'tis to Brutes my Birth I owe.
But what Improvements can be made
By *Education*'s friendly Aid?
Art took me from my Mother's Side,
And did a kinder Nurſe provide;
Whoſe Care ſo far prevail'd, that ſoon
I found my native Roughneſs gone.
But ſuch my *Pride* (*ſhame to reveal!*)
My Parents I would fain conceal;
Thoſe Beings whence I did attain
My ſecond Being; but in vain:
We're ſo alike, that who they are
My very Features muſt declare.
By them I was train'd up to arms,
And made the Guard of female Charms;
And tho' I ſeem of gentle Mein,
At Combats I have often been.
But ſhould you think I favour *War*,
To ſhew how much I Peace prefer,
I've ſuch obliging Ways about me,
There's ſcarce a Viſit made without me;
And I am dreſs'd, where e'er I go,
To ſympathize with Joy, or Woe.

III. ÆNIGMA, 102. By Mr. *Thomas Sadler* of *Norbury*, Cheſhire.

WHEN I ſet out but few can tell,
Who near the *Iſle of Ely* dwell;
Sometimes I'm high, and ſometimes low,
And oftimes am a public ſhow;
Fickle I am and unconfin'd,
And am as wav'ring as the Wind.
In various Shapes I oft appear,
And ſtill a *Chriſtian* Name I bear.
Ye *Fair*, who glitter at a Ball,
For Brightneſs I excell you all!

Like *Damon* too, I have been ſeen,
To dance at Night upon the *Green.*
Oftimes I trip the Flow'ry Mead,
And *dextrouſly* the Water tread;
Or, on ſome lonely *Deſart* range,
And fluctuating oftimes change.
Alternative upon the Plain,
Some Men purſue my Steps in vain;
And ſome with *Terror* fly from me,
Or at my Sight, affrighted be;
Others on me with Wonder gaze,
And thence will ſtrange Conjectures raiſe.
The *Pranks* I've play'd moſt Men ſurprize;
But whence I come they can't deviſe;
Some think that I'm deriv'd from Nought,
So *hypothetical*'s their Thought.
In Solitude my Life I ſpend;
Adieu, ye Fair, 'tis Time to end.

IV. ÆNIGMA, 103. By the ſame *Gentleman.*

FOR my *Original* ſearch Parent *Earth*,
Whence you will find ſhe gave our *Lineage* Birth;
Who bred *us* up to make a gallant Shew,
And then endure ſome various Scenes of Woe.
Were *rub'd* and *cruſh*'d to gain our *preſent* State,
By Man endure ſuch dire Extremes of Fate;
From Town to Town we oft to Market go,
And ſold to thoſe who well our Worth do know:
Mangled and bruis'd and drown'd, and eat at laſt,
Five Hundred Brethren ſerve for one Repaſt.
Thoſe who in *Dainties* exerciſe Delight,
We moſt attend, —their Appetite excite;
Where *Grandeur* dwells we ſtill at Table wait,
And ſometimes at a humble *Cottage* Treat.
A *Sov'reign* Remedy in us you'll find;
And yet we are the *Dread* of human Kind:
The *Ladies* love us but we'll not expoſe—
And he that does, we'll take him by the Noſe.

⁂ *Whoever ſends the beſt Anſwers to the following Ænigma before Candlemas next, will be entitled, by Lot, to 4, 3, and 2* Palladiums, *to be delivered in* London *according to Direction.*

PRIZE ÆNIGMA. *By Mr.* CHRISTOPHER MASON, of Eaſtburn, Suſſex.

TO fifty of my Fellows I am ſent,
All Sharers of one cloſe Impriſonment;
In wooden *Tower* prepar'd for our Reſtraint.
Silent we paſs our Time each livelong Day,
Unus'd to Plots, unknowing to betray.
When ſome bold Hand unbolts our Iron Bar,
Then we once more at Liberty appear;
Tho' free'd, we find that our Releaſe is ſhort,

And whilſt at large we're made to ſerve for Sport,
When on an *Errand* ſent, how ſwift we fly!
And then to take us, how our Jailors try:
We hide our Heads in Earth; but all in vain,
By hot Purſuit we're *Captives* made again.
Various our *Fortunes*, having done much Harm;
Three *Wings* we have, but neither *Leg* nor *Arm*;
Yet from no monſtrous Birth our Kind proceeds,
Which for exact Proportion none exceeds,
And *Champions*-like, wear Helmets on our Heads.

The QUERIST.

NEW QUERIES.

I. QUERE 102. *By Mr.* HUNTLEY, *of Burford.*

FOR what End does EUCLID pretend to *demonſtrate ſeveral* PROPOSITIONS, that are ſelf-evident, and may be taken as *fundamental Axioms*, to demonſtrate Truths, in Geometry, that are not ſelf-evident? Eſpecially as Mr. *Locke* ſhews, in his *Human Underſtanding*, that Knowledge *ſelf-evident*, neither admits of, nor requires, any *Proof?*

II. QUERE 103. *By Mr.* THOMAS HALL.

WHETHER *Credit* in Trade, tends moſt to its *Prejudice*, or Advantage?

III. QUERE 104. *By the ſame* Gentleman.

IN the Year 1759, on *Saturday*, 13th *January*, about 8 in the Morning, an Eclipſe of the *Moon* happened at *Greenwich*, on what Year, and on what Month-Day, Week-day, and Hour of the Day will this Eclipſe return, or happen again?

IV. QUERE 105. *By Mr.* Alexander Rowe.

WHY *Twinkling*-Lights the Stars appear?
Why Planets ſteady Faces wear?

V QUERE 106. *By Mr.* Iſaac Tarrat *of* Epſom,

Mr. Pope ſays, in his *Eſſay on Man*,

"Reaſon's whole Pleaſure, all the Joys of Senſe
"Lie in three Words, *Health*, *Peace*, and *Competence*."

What is *Competence?*

VI. QUERE 107. *By the ſame* Gentleman.

WE frequently hear of *Trees*, *marine Shells*, and *Bones* of Animals being dug out of the Earth, and at a great Diſtance from the Sea, ſuppoſed to have been left there at *Noah's* Flood; and many of the *oriental* Writers, as well as our own Countrymen, *Burnet*, *Whiſton*, &c. are of Opinion that the Inhabitants of the *antediluvian* World were more populous than the preſent. *Quere* the Reaſon why there are not great Quantities of human Bones found, in like Manner as above? And whether it was a *partial* or *general* Deluge?

VII. QUERE 108. *By* Amelia.

WHY the Moon appears much bigger at Riſing, then when ſhe is aſcended far above the Horizon?

VIII.

VIII. Quere 109. *By Mr.* Freeman.

HOW far is a Cannon from you, when you hear the Sound 10½ Seconds of Time after ſeeing the *Flaſh*?

IX. Quere 110. *By Mr.* Williams.

HOW deep is that *Well*, when you hear the Sound of a Stone ſtriking the Water at the Bottom, 4½ Seconds of Time after you let it fall?

X. Quere 111. *By* Brittanicus.

WHAT are the Limits of North and South *America*?

XI. Quere 112. *By Miſs* Sprightly.

~~What is Wit?~~

XII. Quere 113. *By Miſs* Ray.

What is Truth?

XIII. Quere 114. *By* Ens Rationale.

WHETHER the *Chatham* Philoſopher, (who denies the Exiſtence of the *Rays* and Subſtance of *Light*) be a *Shadow* without Subſtance, a Being without Senſes, or a Man, or a Maggot? And whether *imaginary, chimerical,* or *real Ideas,* are not the Proof of *imaginary, chimerical,* or *real* Knowledge?

*** *Whoever finds the beſt Anſwers to the following Quere by* Candlemas-day *has a Chance, by Lot, for 4 and* 2 Palladiums, *which will be delivered in* London *according to Directions given.*

Prize-Quere *by Mr.* Christopher Mason.

IN what Year of the *Julian* Period, and in what Year before *Chriſt* and on what Day of the Month and Week-day, *Julian* Style, was the World or Univerſe (moſt *probably*) created, about which there is ſo wide a Difference among *Chronologiſts*?

NEW QUESTIONS.

I. Question 162. *By a* Cadet.

A GARRISON of 6500 Men has *Proviſion* for 64 Days; but is ſo blocked up by the Enemy going to beſiege it, that it has but *one Way* of being relieved and ſupplied, at the End of 12 Weeks: The *Governor* being able to hold out for that Time: *How many* Men muſt be diſcharge, that the Proviſions in Store may be ſufficient for the reſt?

II. Question 163. *By a* Military Officer.

THERE are 8000 Men in a *Garriſon* beſieged, whoſe *daily* Allowance is 24 Ounces of Bread for 7 Weeks; but the *Governor* finding the Siege is likely to continue a longer Time, who can hold out 24 Weeks, at *leaſt*, tho' he has by this Time loſt 1500 of his Men; whereby he finds himſelf obliged to ſhorten that Allowance of Proviſions: *How much* Bread muſt each Man's daily *Allowance* be reduced to?

III. Question 164. *By a young* Gentleman *of* Woolwich-*Academy*.

IF 250 Men in 6 Days of 12 Hours long, can dig a Trench 236 Yards long, 4 Yards wide, and three deep; in *how many* Days of 10 Hours long, can 50 Men dig a Trench 350 Yards long, 16 Yards wide, and 4 deep?

IV.

IV. QUESTION 165. *By an* ENGINEER.

IN what Direction muſt a *Cannon* (a twenty four Pounder) be placed, to hit an Object whoſe Diſtance is 7333 Feet, on a *Plane* depreſs'd 11° below the horizontal Level, the greateſt horizontal Random of the Piece being 8190 Feet?

V. QUESTION 166. *By Mr.* George Stapley.

THE Breadth of a *River* is 1000 Feet; and the *Peers* of a Bridge built over it take up 720 *Feet* of that Breadth; the *Velocity* of its Stream is 3 *Feet* in a *Second* of Time: *Required* how many Feet the *greateſt Fall* of the Water will be by that Impediment?

VI. QUESTION 167. *By Mr.* W. Williams *of* Hackney.

REQUIRED the true Time of the *vernal* and *autumnal* Equinoxes, Summer and Winter *Solſtices*, alſo the Spaces of Time from the *vernal* to the *autumnal*, and from the *autumnal* to the *vernal Equinoxes*, for the 706 and 2365 Years of the Julian Period; and to give the Method of Computation?

VII. QUESTION 168. *By a* Gentleman *of* Chatham Dock-Yard.

REQUIRED the ſolid Feet of Timber in a dry Oak Tree, weighing 15 Hundred and ¼ of a Hundred Weight, by a *general Rule?* And to give a *general Method* of meaſuring all Sorts of Timber, or other Wood (uſed in building *Ships* and *Houſes*) by Weight, allowing for different *Dryneſs* and *Texture* of the ſame Kind of Wood?

VIII. QUESTION 169. *By Mr.* George Staply.

A PIECE of round Timber is 24 *Feet* long, and ¼ of the Circumference at the Bottom (commonly called the *Girt*) is equal to 3½ Feet; and at the upper End the *Girt* is ½ Foot, and conſequently is 2 *Feet* in the Middle; Now, according to the common Way of meaſuring round Timber, the *Solidity* is 96 Feet: *Required* to find *how much*, in Length, may be cut off from the Top, and yet the *ſolid Content* of the remaining Part, meaſured in the *common Way*, by taking the fourth of the *Girt* in the *Middle*, ſhall be exactly 96 *Feet?* And to determine the *true Quantity* of each Piece of Timber?

IX. QUESTION 170. *By Mr.* George Brown *mathematical and Writing-Maſter*, at *Portſmouth-Common.*

REQUIRED the Year, Day of the Month, and Week-day *Julian* Style, anſwering to the 1126 Year of the *Turkiſh Hegira*, and 12th Day of the ſecond *Turkiſh* Month *Saphar?*

X. QUESTION 171. *By Mr.* George Stapley.

BEING at an Entertainment with a *Gentleman* and *Lady* lately married, where our Ages became the Subject of Converſation, the Lady was pleaſed to communicate her own and Huſband's Age as follows.

"*If both our Ages are added together their Sum will be* 88 *Years; and if the* Date *of the Year in which I was born be divided by my* Huſband's *Age, the Quotient will be equal to my Age, when* 6 *Years and* $\frac{6}{7}$ *are added; but, if you divide the* Date *of the Year in which my Huſband was born by my Age, the Quotient will be equal to his Age, when* 23 *Years and* $\frac{7}{9}$ *are added:" Required their Ages?*

XI. QUESTION 172. By Mr. *Thomas Sadler*, Mathematical Maſter, at *Norbury, Cheſhire.*

A worthleſs *Miſer*, as I'm told,
Had hoarded up vaſt Store of Gold;

Large Sums put out to Uſury,
'Till aged fourſcore Years and three;
When Death depriv'd him of his Pelf,
And took him from his *ſecond Self*,
Of Wives, it happen'd he had three,
Three Sons, and Daughters *two* had he;
His third Wife did ſurvive him ſtill;
But mark the Tenor of his Will,
Of ruſty Gold *ten thouſand* Pound
Was in this Miſer's Coffers found;
Each Son muſt be paid down in Store,
Each Daughter's *Fortune* three Times o'er,
Each Daughter's, as the *Will* was made,
Muſt twice the *Widow*'s Part be paid;
Now th' *Old* Miſer's in his Grave,
Tell me the Fortune each muſt have?

XII. QUESTION 173. *By Mr.* George Stapley.

REQUIRED to find the *leaſt* 3 *whole* Numbers, ſo that $\frac{3}{8}$ of One, $\frac{5}{14}$ of another, and $\frac{7}{20}$ of a third ſhall be all equal?

XIII. QUESTION 174. *By Mr.* John Buddle, *at* Cheſter-Le-Street, *near* Durham.

A MASTER of a Ship being at Sea, on *May* 19th 1759, in Latitude 40° 20′ N. took the Sun's equal Altitudes, obſerving the Times of theſe Obſervations, by his Watch, at $9^{h}\ 12^{m}$ in the Forenoon, and $2^{h}\ 59^{m}$ in the Afternoon: *Required*, from thence, the Time by his *Watch*, on that Day, when the Sun paſſed the Meridian, or was at his *greateſt* Altitude?

XIV. A NEW QUESTION in Navigation, 175. *By the Author of the* Royal Aſtronomer *and* Navigator.

Given a Ship's conſtant Courſe S. 27° 10m *weſterly, in ſailing betwixt two Places, both in North Latitude; the Diſtance ſailed on that Courſe* 1389.2 *Minutes of a Degree, and the Difference of Longitude of thoſe Places* 12° 8′ W. *Required their Latitudes, reſpectively?*

XV. QUESTION 176. *By Mr.* Paul Sharp.

THERE is a *rectangular Ciſtern*, holding the *greateſt* Quantity poſſible of its *Dimenſions*; whoſe Length is $8\frac{1}{2}$ Feet, and the Length of the *longeſt* ſtrait Rod that can be put into it, 10 *Feet*: Required the *Breadth* and *Depth* of this Ciſtern; and *how long* it will be emptying, when full of *Water*, through a *circular Hole* of 2 Inches Diameter at the Bottom thereof?

XVI. QUESTION 177. By ANALYTICUS.

A Perſon owes me a Sum equal to the Value of a Number of Guineas *and* Shillings. *The* Difference *of the* Cubes *of the Guineas and Shillings is equal to* 45 *times the Product of the Guineas and Shillings and* 27 *over; and the Difference of the* Squares *of the Guineas and Shillings is equal to* 12 *Times the Sum of both. What is the Debt due to me; the Guineas being leſs than the Shillings?*

XVII. QUESTION 178. *By Mr.* Paul Sharp.

THE *Abſciſſa*, Semiordinate, and Parameter, of the leaſt *common Parabola*, that will circumſcribe a *Circle*, are equal to [illegible], $\frac{3}{4}$, and $\frac{1}{2}$ of the ſaid Circles Diameter, and the *Parameter* multiplied by ,630547 is equal to the Difference of the Circles *Periphery*, and Curve of the ſaid *Parabola*: Required the *Demonſtration*?

XVIII. QUESTION 179. *By Mr.* Joſeph Wooſe, *of Mr.* Johnſon's *School at* Hull.

GIVEN the Altitude of a Cone 50 Inches, and the Difference between the greateſt inſcribed Hemiſphere and Cube = 5 Wine Gallons, to find the Dimenſions of each of thoſe Solids?

XIX. QUESTION 180. *By Mr.* Geo. Brown.

SUPPOSE a *conical* Glaſs of Diameter at Top 5, and Height from the Bottom 7 *Inches*, to be $\frac{2}{5}$ths full of Water; *Required* the Dimenſions of that Spheroid, whoſe Segment being immers'd in the Water, with its Conjugate Parallel to the Glaſs's Top Diameter, ſhall cauſe it to riſe the *higheſt poſſible*, and alſo to give the Content of the immerſed *Segment*?

XX. QUESTION 181. *By the* Author.

REQUIRED the Value of x, when $\overline{l.\,x.}|^{\,l,\,x}$ is a *Minimum*; l denoting the *hyperbolic* Logarithm of x?

*** *Whoever anſwers the following Queſtion before the* 1ſt *of March next, has a Chance by Lot for* 12 Palladiums, *which will be delivered in* London, *according to Direction given.*

PALMÆ PROBLEMA a DOMINO HUNTLEIO, Burfordiæ.

GLOBI duo A *et* B (*quorum prioris pondus eſt unicarum, alterius* 10) *à viris duobus* 150 pedes *diſtantibus per* aream *conglaciatam ſimul projiciuntur, et factâ percuſſione mutuâ, ad plagas diverſas tendunt. Summa Spationarum à* globis *ante impactionem percuſſorum æquat* 335 pedes, *et minoris momentum ad momentum majoris eandem tenet* rationem *quam* 7 *ad* 3. *Planum autem globos in puncto concurſos tangens, ex æquo ſecat virorum diſtantiam, et vis compreſſiva eſt ad vim elaſticam ut* 16 : 7. *ſepoſitâ glaciei fricatione, et aliâ quâvis cauſâ motum retardante: Inveſtigentur* directio *et* celeritas *utriuſque globi impingendo acquiſitæ.*

NEW PARADOXES, REBUSES, &c.

I. PARADOX. By Mr. *W. Swift*, of *Stow*, near *Lincoln*.

WHEN *Speedwell* and *Hazard* had ballanc'd their Books,
Thus *Speedwell* to *Hazard* declares;
Tho' my GAINS are, I find, more than yours by ten Pounds,
Yet to *Each* the *ſame Cube-Root* appears.

II. PARADOX. By Mr. *George Stapley*.

Plant me twenty one Trees, juſt in *twenty four* Rows;
Four of Four, *Six* of Five, *Fourteen* of three compoſe.

I. *Rebus*. By Mr. *Stow*.

A *Metal* well known, and *Reverſe* of Denyal,
Give the Name of a Town—if you pleaſe to make Trial.

II. *Rebus*. By the Same.

A *Point* of the Compaſs, and a *Priſon* in London,
Which many have *ſet up*, and many have *undone*;
(I neither deceive, nor a *Story* invent)
Are the Name of a Town in the County of *Kent*.

A *Rebus Paradox.* By *Cunundrumenſis.*

The Name of a *Sex* join'd to what we *diſdain,*
Is the Name of an *Object* we ſeek to obtain !

ANSWERS to all the ÆNIGMAS in the PALLADIUM, for 1759.

I. A Saddle. II. A Collar. III. Jack and Bowles. Prize
A HALTER.

One of our *Fair* Correſpondents (Mrs. *Beaumont*) ſends us the following *excellent* Quotation on Constancy, ſo amiable and ſo admired a *Quality* in her Sex.

But firſt let yawning Earth a Paſſage rend,
And let me thro' the dark Abyſs deſcend ;
Firſt let avenging Jove, with Flames from high,
Drive down this Body to the nether Sky,
Condemn'd with Ghoſts in endleſs Nights to lie ;
Before I break the plighted Faith I gave :
No ; He who had my Vows, ſhall ever have ;
For whom I lov'd on Earth, I'll worſhip in the Grave !

Dryden.

The *ſame* Correſpondent anſwers the *Prize Ænigma* on the *Inconſtancy* of the *Male* Sex.

The Men who *deceive* us, are all clever *Fellows !*
Who have nothing to fear —— if they 'ſcape but the G—— s ! Prize.

Anſwered by Mr. *Swift* of *Stow*, near *Lincoln.*

Like a Horse ſtout and bold, to the Wars will I go,
I'll Harness myſelf, and I'll fight the proud Foe ; 1.
As *ſwift* as the Bowles to the Jack will I run, 3.
Neither Sword, Fire, or Water, nor *French* will I ſhun.
I hope that all *Traytors* and *Cowards* may Swing, Prize.
While each honeſt Tar drinks a Health to the *King.*
For *Scalping* — *Monſieur* a tight Collar ſhall wear, 2.
While *Britons* and *Pruſſians* illuſtrious appear !

Hippocrates's Anſwer to the *Prize Ænigma*, in Advice to *Galen*, his Friend and Companion.

Beware, my Friend, the Halter ſhun, *Prize.*
And from thy evil Courſes run ;
And thou, at laſt, ſhall ſurely gain,
Immortal Joy for mortal Pain !

The *ſame* anſwer'd by Mr. *I. Hayden*, *Biſhopſton.*

Ye *Knaves* and ye *Cheats* of the Halter beware, Prize.
Leſt, by *Schemes* you contrive, you contrive your own Snare !

All anſwered by Mr. *George Stapley.*

A Saddle, a Collar, Jack, Bowles, and a Halter,
Are eaſily ſolved by a Boy in his *Pſalter.*

We having not Room, cannot inſert the other Anſwers by Mr. *Thomas Sadler*, of *Norbury*, *Cheſhire.* *Burfordienſis* ; Mr. *Robert Abbey* of *Watford*, *Northamptonſhire* ; Mr. *Iſaac Tarrat* of *Epſom*, *on the Subject of the gallant Behaviour of our Admirals and Sea Officers* ; Mr. *Buddle*,

dle, of *Cheſter-lee-Street*, near *Durham, a Youth of* 15 *Years of Age, of uncommon Genius*; Mr. *I. Shield*; Mrs. *Mary Willeter*; Mr. *Hicks* of the *Devizes*; *Amelia, Urania, Fidelia,* Miſs *Green*, and a great many others.

We acknowledge the Favours of all our ingenious Correſpondents, and hope they will excuſe us for omitting ſome of the leſs important Part of their Productions to inſert what we judge (and appeal to themſelves for our Opinion) is more *eſſentially neceſſary* for the Improvement of *uſeful Science.*

⁂ Those who are pleaſed to ſend us *new Ænigmas* (as full of Wit as they can hold) with elegant new or uſeful *Queries, Queſtions,* and *Paradoxes*, or witty Anſwers to the Ænigmas, we ſhall carefully diſtinguiſh according to their reſpective Merits.

And that none may be diſcouraged in trying their *Genius*, we aſſure our Male and Female Correſpondents, that they cannot poſſibly be *too witty* in their *Ænigmatic* or other Compoſitions, in Verſe or Proſe. For *Wit* (let them be appriz'd) is even an Excuſe for moſt of its own Faults; *Immorality* excepted. Therefore, all thoſe having a large *Stock* of *Wit* to diſpoſe of may ſend it forthwith with as much *Humour* with it as they can ſpare, and we (like faithful Agents) ſhall convey it to a proper Market.

The Productions of the *Queriſts, Problemiſts,* and others of *Science*, we ſhall duly diſtinguiſh in *proper Claſſes*. And we take Leave to apprize thoſe who are pleaſed to honour us with their Improvements, in theſe Reſpects, that as the *Palladium Plan* is *improved*, and pretends to contain more of the *ſelect* and *uſeful* than other annual Works, it will therefore not be amiſs for them to keep an Eye upon that Rule.

Answers to the Queries in the Palladium for 1759.

I. Quere 89. Anſwered by Mr. *Huntley* of *Burford.*

The Earth having her *half Surface* next the Sun always enlightened, while the *contrary* half Surface is involved in her *conic* Shadow, oppoſite to the Sun, projected to a conſiderable Diſtance beyond the Moon's Orbit; which ſhe paſſes through, moving along in her Orbit, ſhe is thereby deprived of the Sun's Light, and would be loſt to our Sight, 'till ſhe *emerges*, were we not involved in her Shadow at the ſame Time; where we behold her by ſome *Cauſe* of various Light caſt over her Face. Which *Cauſe* is probably the Earth's Atmoſphere (*wherein we are placed*) being ſubject to *perpetual* Changes, and endow'd with a Power of *reflecting* and *refracting* the Rays of Light differently; and, according to its different Diſpoſitions, produces different *Effects* of Viſion. And the Moon's *Face* is preſented to us in the various Colours of *red, Iron-Grey, bluiſh, yellowiſh,* and ſometimes *totally dark*; as have been obſerved by the moſt curious and eminent Aſtronomers.

II. Quere 90, *anſwered by Mr.* Huntley.

When the Moon's *Lat.* or her Diſtance from the Earth's Orbit, exceeds the *Sum* of the Semidiameters of the Moon, and Earth's *Shadow*, at the Moon's Orbit, there can be no *lunar* Eclipſe; provided She is more than 12° 34′ from her *Node*; the Place where ſhe croſſes the Earth's Orbit.

When the Moon's Lat. exceeds the *Sum* of the Semidiameters of the Earth's *Diſk*, and the Moon's Shadow at the Earth, we ſhall ſuffer no

Deprivation of the Sun's Light, by the Moon's Interpoſition betwixt the Sun's Body and our Sight; provided the Moon's Diſt. from the *Node* exceeds 16° 26′.

Now, the Ecliptic *Boundaries* in the *latter* Caſe, exceeding thoſe in the *former*, more *Eclipſes* of the Sun will always happen than of the Moon.

Moreover, the Semidiameter of the Moon's *penumbral Cone*, being nearly 2450 Miles, and the Earth's Semidiameter almoſt 4000, 'tis evident, that the Earth's Hemiſphere in a *Solar Eclipſe*, cannot be totally involved therein. And, as we are not leſs than 3500 Miles from the *Equator*, a Number of *Solar* Eclipſes may happen, when the Moon's *Shadow* never reaches us. Which *Cauſe* not equally affecting *lunar* Eclipſes, is the Reaſon that *more Eclipſes of the Sun than of the Moon, happen.*

Remark, Eclipſes of the Sun are more frequent than thoſe of the Moon, (as has been ſhewn) becauſe the Ecliptic *Boundaries* for the former are greater than for the latter happening — Yet there are more *viſible* Eclipſes of the Moon than of the *Sun*; becauſe viſible lunar Eclipſes are equally ſeen of the ſame Bigneſs, from all Parts of the Earth's half Surface next the Moon: Whereas viſible *Solar* Eclipſes are unequally ſeen, of different Bigneſs, and only from a ſmall Part of the Earth's half Surface, next the Sun, whereon the Moon's Shadow ſalls — from one ſmall Part thereof are ſeen total — from the reſt of the ſmall Part of that Surface, *partial* — But from above two Thirds of the Earth's Surface a *Solar* Eclipſe is generally *inviſible*; whereas a lunar Eclipſe can be inviſible but to half the Globe — Hence another Reaſon for more inviſible Eclipſes of the Sun than Moon.

III. QUERE 91. Anſwered by a Reader of *Locke's Human Underſtanding*.

Natural and *Artificial* Days (denoting among Aſtronomers the Times from Noon to Noon, and from Sun-riſe to Sun-ſet reſpectively) are Terms adopted by *Cuſtom* and long Uſage. Therefore it would be as difficult to alter thoſe Diſtinctions, as to introduce *new Terms* to denote *Light* and *Darkneſs*, or *Day* and *Night*, while the old Terms are ſo well underſtood, and eſtabliſhed by *general Cuſtom*.

Yet (if *Cuſtom* will permit) the Term *Mean-Day* may be introduced for *natural Day*; and *Apparent Day* for *Artificial Day*. But, ſince it has been objected in the former *Diſtinction* of natural and artificial Day, that an *artificial* Day is alſo a natural Day; ſo in this *new Diſtinction*, it may be objected, that a mean Day is alſo an apparent Day, in the unſettled Signification of Words.

See Locke on the Abuſes and Imperfections of Words. Who has ſhewn that no Man's *Property* is ſafe, while the Meaning of *Laws*, or Writings for Security of Property, can be wreſted by *Lawyers*, explaining Words to ſignify *any Thing*, or *Nothing at all.*

IV. QUERE 92, *anſwered by* The AUTHOR.

THE *Harveſt Full Moon* is diſtinguiſhed by the *Vulgar*, (who were the firſt and greateſt Obſervers of it) for its affording *extraordinary* Light ſoon after Sun-ſet, in the *autumnal* Seaſon, for reaping the Fruits of the Earth and gathering the Harveſt, in the *Temperate* Zones, where this Harveſt Full Moon is *moſt* wanted; and therefore moſt uſefully contrived by *Providence*.

This *Full Moon* happens for *moſt Advantage* when the Angle of the Ecliptic, or Moon's Orbit, and the Horizon, at Moon Riſing, makes the leaſt Angle, being when *Aries* riſes and *Libra* ſets. And contrarily, when *Libra* riſes and *Aries* ſets, this Angle of the Ecliptic (or the Moon's Orbit nearly) and the Horizon is the *greateſt*; or nearly the *leaſt* when *Piſces* riſes and *Virgo* ſets, or nearly the *greateſt*, when *Virgo* riſes and *Piſces* ſets. So that the *autumnal* and *vernal* Full Moons, afford the *greateſt* and *leaſt* Light, alſo riſing the ſooneſt and lateſt after Sun-ſet, *reſpectively*. And the greater the Lat. of any Place leſs than 66° 29′, the Lat. of the Polar Circle, the *leſs* the Angle of Ecliptic and Horizon, when ♈ riſes: For, at the Polar Circle the Ecliptic and Horizon are coincident for a Moment, once every 24 Hours; and the next Moment one half of the Ecliptic, ♑, ♒, ♓, ♈, ♉, ♊, riſes, while the *contrary* Half ſets; affording a wonderful *Phænomenon*; the Moon being here moſtly above the Horizon in the Sun's Abſence. When the *Harveſt full Moon* at Riſing happens to be in the beginning of *Aries*, and near her *Nodes*, or has but ſmall Latitude; the Angle that the Moon's Orbit then makes with the Horizon at Riſing will be *leaſt*, or nearly ſo; and therefore her *Depreſſion* below the Horizon for 1 Days Motion, or more, will be the *leaſt* alſo; when ſhe will afford the greateſt Light for the *Farmer*'s Uſe; riſing the *ſooneſt* after Sun-ſet for a Week.

'Tis evident, this *full Moon* will always happen near the *autumnal Equinox* (as is providentially ordered) when the Sun ſets in *Libra*; the *Intervals* of her Riſing for two ſucceſſive Evenings will be *very ſmall*; ſcarcely exceeding 20 Minutes of Time.

Hence, when the Harveſt Moon, at Full, has the greateſt South or North Latitude, it deſcends lower or riſes higher above the Horizon, and conſequently affords leſs or more Moon Light, as in the following Years.

HARVEST MOONS affording the LESS LIGHT.

N	1751	1752	1753	1754	1755	1756	1757	1758	1759	1797
	1770	1771	1772	1773	1774	1775	1776	1777	1778	
	1788	1789	1790	1791	1792	1793	1794	1795	1796	
	1807	1808	1809	1810	1811	1812	1813	1814	1815	
	1826	1827	1828	1829	1830	1831	1832	1833	1834	
	1844	1845	1846	1847	1848	1849	1850	1851	1852	

Here the Moon, in Dates to the Left is in the greater N. *Lat. and deſcends to the greater* S. *Lat. in Dates to the Right.*

HARVEST MOONS affording the greater LIGHT.

S	1760	1761	1762	1763	1764	1765	1766	1767	1768	1769
	1779	1780	1781	1782	1783	1784	1785	1786	1787	
	1798	1799	1800	1801	1802	1803	1804	1805	1806	
	1816	1817	1818	1819	1820	1821	1822	1823	1824	1825
	1835	1836	1837	1838	1839	1840	1841	1842	1843	

Here the Moon, in Dates to the Left is in the greater South Latitude, and aſcends to the greater Lat. N. *in Dates to the Right*

See *Ferguſon*'s Aſtronomy. p. 131.

Extraordinary Phænomena of this *Harveſt Moon* happen at the *polar Circles*, where the Sun continues 24 Hours above, when in the

Winter Tropic, and 24 Hours below, the Horizon, when he is in the *Summer*, or contrary Tropic; and for the ſame Reaſon the Full Moon neither riſes in Summer *(when not wanted)* nor ſets in the Winter *(when moſt wanted)* conſidering her as in, or *near*, the Ecliptic. For, the Winter *full Moon* being as high in the Ecliptic as the *Summer*-Sun (in oppoſite Signs) muſt be viſible as long; and the *Summer* Full Moon being as low in the Ecliptic, as the *Winter* Sun (in oppoſite Signs) is below the Horizon, in the Night as he is then. Theſe are the only extraordinary *full Moons* that happen when the Sun is about the *Tropics*; all the others, at different Times, riſing and ſetting.

In *Summer*, the Full Moons are *low* and Stay but ſhort, when Nights are ſhort and Moon-Light is *leaſt* wanted. In Winter, the Full Moons go *high*, and ſtay *long*, when Nights are long and Moon-Light *moſt* wanted.

At the *Polar* Circles, Latitude 66°½, the *Harveſt-Moon*, at a Mean, riſes only an Hour later in 15 Days from her 1ſt to her 3d Quarter. But becauſe the *Obliquity* of her Orbit to the Ecliptic, and ſhifting of her *Nodes* therein, make much Alteration in her Riſing and Setting in an oblique Sphere, from what they would be if ſhe moved in the Ecliptic, the great Effect of theſe Cauſes, at the *polar* Circles, is the more remarkable as follows.

When the Moon's aſcending ☊ is in the Beginning of ♈, ſome of the 4th Part of her *Orbit* does not riſe; and while the Moon continues in that Part of her Orb, which is 4 *natural* Days, ſhe keeps below the *Horizon*; and in the oppoſite Part of her Orbit, which does not ſet, is as long above the Horizon.

In 9½ *Years*, when the *Nodes* have ſhifted round the Ecliptic, every Degree of her Orbit riſes and ſets, and ſo ſhe does here every Day of her *Age*.

When the aſcending *Node* is in ♋, the *autumnal* Moon differs but one Hour in Riſing from the 9th to the 24th Day of her *Age*. and in that Time 23 Hours in Setting; the Riſing Difference being all in the laſt 2 of theſe Days: For from the 9th to the 22d ſhe ſtill riſes at the *ſame Hour*, but changes her *Amplitude* from the South Part of the Horizon 160° Northward, paſſing the Eaſt. — When the aſcending ☊ is in the Beginning of ♑, the Moon varies her riſing *Amplitude* 180° from the South to the North Point of the *Horizon*, between the 7th and 22d Days of her Age, being ſenſibly later in Riſing for all thoſe 15 Days; and what is ſtill *remarkable*, during the 14, 15, and 16th Days of her *Age*, ſhe riſes a *Quarter* of an Hour ſooner; *contrary* to what happens at all other Times.

In the above 15 Days, ſhe varies her *Amplitude* quite through the *Weſtern* Semicircle of the *Horizon*, and retards her Setting by 24 Hours. At the *Poles* ſhe is moſtly above the Horizon in the Sun's Abſence, and abſent when he is above the Horizon.

V. QUERY 93, *anſwered by* Cantabrigienſis.

BY cutting off the *Parts* of a correct Map, repreſenting Land, from the Parts repreſenting Water, and weighing thoſe Papers ſeparately in Scales, you will *moſt nearly* determine the Ratio of the Surface of Land to that of the Water, on our *terraqueous* Globe.

Dr. *Long* of *Cambridge*, by this Method determined (from *Senex's Globe-Papers*) the *Ratio* of the Surface of Land to that of Water, as 124 to 349 Grains; being as 1 to 3 *nearly*.

VI. QUERE 94, *anſwered by* Oxonienſis.

BESIDES our being deceived from the greater or leſs *Brightneſs* of Objects, the *Judgment* is further deceived in the greater or leſs *Magnitude* of Objects, by referring them to a greater or leſs Diſtance than they are really placed. For *Inſtance*, if an Object be beheld from *low* Ground, over a broad River unſeen, and be beheld from high Ground, at the ſame Diſtance, over the ſame River, with all the intermediate Space viſible, the Object being referred to greater Diſtance in the latter than in the former Caſe, will induce us to judge of it to be larger than it is, though at both Stations ſeen under the ſame *Angle*.

Hence, the Coat of Arms on the *Iron-Gate* in *Clare-Hall* Walks, *Cambridge*, being viewed oppoſite to Fields, riſing gradually beyond, till they almoſt ſeem above, the Gate, the Arms thereon being *red*, and appearing *elevated*, are ſometimes miſtaken for a *Houſe* in thoſe Fields, at a conſiderable Diſtance beyond them. See FERGUSON's *Aſtronomy*.

VII. QUERE 95, *anſwered by a* Man in Woman's Cloths, at *Chatham*.

THE *planetary* Bodies ſeen under bigger and leſs Angles appear bigger and leſs in their Magnitude, at different Times, for the ſame Reaſon that Men and other Objects appear *bigger* and *leſs*, as they are ſeen at a *leſs* or *greater* Diſtances. And therefore the Earth, on which an Obſerver of all the planetary Bodies is placed, moving in an Orbit without the Orbits of *Mercury* and *Venus*, and within the Orbits of *Mars*, *Jupiter*, and *Saturn* (which Orbits are all *elliptical* by Hypotheſis) *cauſes* the different Appearances of the *Magnitudes* of thoſe planetary Bodies, carried ſometimes at greater and ſometimes at nearer Diſtances from and to us. And the different *Poſitions* of theſe planetary Bodies, in Reſpect of the Earth and of one another, (appearing ſometimes *direct*, *retrograde*, or *ſtationary*) according to *Theory*, agreeing with Obſervation, prove the Theory of their Motions to be true.

Imperceptible Inſects cannot be made the Subject of Obſervation without being magnified; and Stars raying out Darkneſs can never enlighten an abſurd Underſtanding in Chatham *or elſewhere.*

Experience ſhews, that the Rays of Light coming from a rarer through a denſer *Medium* are refracted or bent *concave* towards the Perpendicular to the denſer refracting *Surface*, from the Point of *Incidence* of thoſe Rays; and the *contrary* is obſerved of Rays paſſing from a denſer through a *rarer* Medium, the Incident Ray is bent convex to or from the Perpendicular to the refracting Surface.

In the 1ſt *Caſe*, the Rays from the *Sun*, *Moon*, or *Stars* coming concave to the Eye of a *Spectator*, from an *æthereal Medium* through the Earth's denſer Atmoſphere, thoſe Bodies are ſeen elevated, or *riſen*, when they are actually *below* the Horizon; the incident Ray meeting the Eye, near the Earth's Surface, *ſhewing* them in a Tangent to the *laſt Direction* of the Ray coming in a concave Curve all the Way from the Surface of the Atmoſphere to the Earth's Surface. And the more or leſs obliquely the *incident* Ray falls with the Perpendicular to the Tangent of the *refracting Surface*, at the Point of *Incidence*, the greater or leſs it is found by Experience will be the Refraction; from the *greateſt* of all in the Horizon, leſs and leſs in Altitude, to none in the *Zenith*; becauſe the *Perpendicular* to the Surface of the Atmoſphere, and incident Ray from the Zenith, coincide, where Experience ſhews there is no *Refraction*. And upon the ſame Principle of Refraction it is that the *Sun*, *Moon*, and *Stars* appear riſen while they are actually below the Horizon, that a *Piece of Money in a Baſon* is brought in View, which without a *denſe Medium* of Water interpoſed, could not be ſeen. And in *Nova Zembla* the Sun appears to riſe 17 Days before the Time by Calculation according to the Sphere; after a Night of 5 Months. And Cattle feeding in *Black-Wall* Marſhes can be ſeen from *Greenwich-Hill*, near the *Thames*, in *England*, at *High* that are inviſible at *Low*-Water.

By the *Atmoſphere* reflecting the æthereal *Subſtance* of *Light* every Way, Objects become every Way round us viſible, and alſo all Parts of a ſingle Object. But without this *noble Medium* of Air, ſo neceſſary to *Viſion*, Objects could only be ſeen directly oppoſite to the Sun. For the Sun's *illuſtrious* Body itſelf could give no Light, except directly forwards, if the Air or Atmoſphere were taken away; and no Part of an Object could be ſeen but where the Sun ſhone *directly* upon it; and we ſhould be obliged to turn every *moveable Object* to the Sun to ſee all its Sides. The *Heavens* would then be dark in the Day, as now they are in the Night, and the Stars would appear. But for the Atmoſphere to *reflect* Light to us after *Sun-ſet* and before *Sun-riſe*, there could be no *Twilight*; but a ſudden Tranſition from Day-Light to *Darkneſs*, and from Darkneſs to *Day-Light*, would ſucceed each other, blinding to our Sight. — But theſe Things may not be underſtood from the *Chatham* Philoſopher's *Theory of Light*, of white Sheets and black Gowns, carried upon Hop-Poles, and the *Miller*, *Chimney-Sweeper*, and *Philoſopher*, ingeniouſly ſhutting one another in and out of Doors. — *Pſhaw!*

Mr. Locke's *Account of what Light is.*

“ If Light were Nothing but a Company of *Tennis* Balls which
“ *Fairies*, all Day long, ſtrike with *Rackets* againſt ſome Men's Fore-
“ heads, while they paſs by others; yet the *Idea* of the Cauſe of Light
“ *(if we could come at it)* would no more give the *Idea* of Light itſelf
“ (being ſuch a particular Kind of *Perception* in us) than the Idea
“ of the Figure and Motion of a *ſharp Piece of Steel* will give us the
“ *Idea* of the *Pain* which it is able to excite in us.

“ The *Cauſe* of any Senſation, and the Senſation itſelf, in all the
“ *ſimple Ideas* of one Senſe, are two *different Ideas*; and therefore it is
“ very well *diſtinguiſhed* between that *Light* which is the *Cauſe* of that
“ Senſation in us, and the *Idea* which is *produced* in us by it; or that
“ which is properly Light.”— And Sir *Iſaac Newton* pretended not to know what the Nature of Light or Gravity were, any more than he pretended to know the Nature of any other Subſtance; only he knew that there was a real not *chimerical* Subſtance, called *Light*; and a real not *chimerical* Property of Matter, called *Gravity*.

VIII. QUERE 96. *anſwered by Mr.* Buddle, *of* Cheſter-lee-ſtreet.

FROM repeated *aſtronomical* Obſervations, *The Squares of the periodical Times of all the Planets moving round the Sun, are diſcovered to be very nearly as the Cubes of their mean Diſtances from him*; and the ſame Proportions univerſally agree in the Motions and Diſtances of the Satellites, or Moons, revolving round their reſpective *Primaries*. Which Properties demonſtrate, that the Earth moves round the Sun, (and not the Sun round the Earth) to agree with Appearances. Therefore if the Sun moved round the Earth, according to this Law, then the Proportion would be,

As the Cube of 240 *thouſand Miles, the* ☽'*s Diſtance from* ⊖, *to the Cube of* 81 *Millions of Miles, the Earth's Diſtance from the Sun (according to an allowed* Parallax) *being as* 1 *to* 38 *Millions* 272 *Thouſand* 753, *ſo is the* Square *of the Moon's* Period *round the Earth, or* 27 *Days* 8 *Hours*, ſquared, *to the Square of the Period, in Days, of any Body moving round the Earth at the Sun's Diſtance; that is, to thirty Thouſand and* 5 *Millions* 835 *Thouſand* 352 *Days; whoſe* Square Root, 273 *Thouſand* 510, *is the Number of Days* required, *or* 475 *of our preſent Years, the Sun would take to revolve round our Earth, at his preſent Diſtance.*

IX. QUERE 97. *anſwered by* Urania.

THE ſtrongeſt *Proof* of the Planets being inhabited is their being attended by Moons, more or leſs, to give them Light by Reflection, in the Sun's Abſence.

For to what other Purpoſe conceivable, beſides to give Light to Beings inhabiting their *Primaries*, in the Sun's Abſence, could theſe ſeveral illuminated Attendants be created? And ſince we find, that the larger in Magnitude, or more diſtant the ſeveral Planets are from the *Sun*, (as ♃ attended with 4, and ♄ with 5 Moons) the greater is the Number of their *Attendant* ☽*s*, it is a further Argument of the Planets being inhabited; For ⊖, that is much nearer the Sun, and of the leſs Magnitude, has but one Moon to attend her Inhabitants. Every one of theſe Moons, or *Satellites*, are alſo, probably, inhabited, (that *a Multitude of Ends may be anſwered by one Work of Creation, as we before obſerved, in all God's Works)* to each of which attendant Bodies, its reſpective *Primary* ſerves alſo as a Moon.

Mr. *Alexander Rowe* remarks thus.

Great Reaſon ſays, nor can we doubt at all,
Millions of Beings dwell on either Ball;
With Conſtitutions fitted for that Spot,
Where Providence all-wiſe has fix'd their Lot.

Baker's *Univerſe*.

X. QUERE 98. *Anſwered by a* Merchant.

HONESTY is reckoned the beſt Policy, becauſe moſt Peace and Happineſs are derived from its Practice: When *contrary* Meaſures are purſued by ſome Men for Profit, they arrive at the Object of their Purſuits, *Riches*, with far leſs Enjoyment and Satisfaction of Mind, than the Acquirers of a *Fortune*, by the *Plain-ſailing-Rules* of fair Dealing and *Honeſty*, always attended with Reputation and Honour.

For grant bad Men what Happineſs they wou'd;
One they muſt want, which is to paſs for good.

XI. QUERE 99. *Anſwered by* Socius.

A BREACH of *Promiſe* is culpable more or leſs, according to the *Degree* of Diſappointment and Injury received by it. To promiſe a Perſon a particular Benefit, and diſappoint him by conferring on him a *greater*, is a *Mark* of a noble Spirit, and of great Friendſhip and Generoſity. But to promiſe a Perſon a *Benefit*, and to keep his Expectation in long and uneaſy Suſpence, without gratifying it, and fulfilling the Engagement, is very *ungenerous and cruel!*

XII. QUERE 100. *Anſwered by* Horace.

THE Favours and Affections of Mankind are found to turn upon the *Hinges* of obliging their *Maſter-Paſſion*.

Men of *Sagacity* and a noble *Diſpoſition* will allow for, and pardon, the *Frailties* and *Defects* of an Inferior; but if, for a *trifling* Offence, you fall under the Diſpleaſure of an ignoble and ungenerous ſoul'd SUPERIOR, his Hatred and Miſchief know no Bounds.

Mr. *Hicks* of the *Devizes* ſays, that the Favour and Affection of Men turn upon *Intereſt*. But tho' we grant, that *Intereſt* is predominant, or a ſtrong Maſter-Paſſion, in *many*, yet it is not found to be ſo in *all*.

PRIZE-QUERE, *anſwered by Mr.* ALEXANDER ROWE, *of* Penzance, Cornwall.

IN the Year 4712 of the *Julian* Period, CHRIST was born, according to *Clem. Alexandrinus*, *Irenæus*, *Euſebius*, *Epiphanius*, *Jerome*, *Oroſius*, *Caſſiodorus*, and other *Antients* of good Authority. Which was the general Opinion till *Dionyſius Exiguus* invented the *vulgar Æra* of *Chriſt*'s Birth, two Years later. Thus Sir *Iſaac Newton*, on *Daniel*, &c. p. 135. According to *Hodgſon*'s Chronology, "the *Chriſtian Æra* "began at Noon of the thirty-firſt of *December*, immediately follow"ing his Birth, being *Saturday* in the 4714th Year of the *Julian* "*Period*." Agreeing with *Dionyſius Exiguus*'s Account.

☞ It ſeems *evident*, that the monthly Time of the *Nativity* of CHRIST, as placed in the *Calendar* of our common Prayer-Books, was (when the *Calendars* were conſtructed) founded upon the *beſt* Authorities; and Sir *Iſaac Newton* having ſince added his Authority for the Year, 'tis probable *Chriſt* was born in the 4712 Year of the *Julian* Period, on the 31ſt of *December*, 2 Years before the Time of the *vulgar* Æra, as Mr. *Rowe* has determined it.

⁂ Mr. *W. Williams*, of *Hackney*, with great *Application* has deduced the Year of the BIRTH of CHRIST, from Mr. *Mann*'s *Chronological Diſſertations*, to be on *Sunday*, *March* 22d in the 4707th Year of the *Julian* Period, when the Dom. Letter was D, *Roman Indiction* 12, Cycle of the Sun 3, and Golden Number 14.

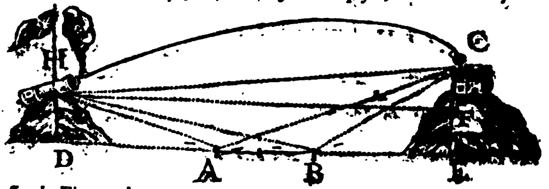
Who has as *indefatigably*, from the ſaid *chronologicall* Treatiſe, by *Nicholas Mann*, Eſq; late Maſter of the Charter-houſe, deduced the Time of the DEATH of CHRIST, to be on *Friday*, *March* 22, and *Reſurrection* on *Sunday*, *March* 24, in the 4739th Year of the *Julian* Period; when the Dom. Letter was F, *Golden* Number 8, *Roman Indiction* 14, *Cycle* of the Sun 7. —— We are much obliged to this

Gentleman for his indefatigable Endeavours to aſcertain the true Time of CHRIST's BIRTH and DEATH, and we ſhould have *gladly* printed his *whole Chain of the Deduction*, had Room permitted; but 'tis hoped he will excuſe us, till an Opportunity ſhall offer to print his whole Account, *hereafter*. And tho' we look upon Mr. *Mann*'s Authority far inferior to Sir *Iſaac Newton*'s, in this *Point*; we have given Mr. *Williams* equal *Chance* by Lot with Mr. *Rowe* for the *Prize Palladiums*.

Mr. *Chriſ. Maſon* makes our SAVIOUR's BIRTH to be on *Saturday*, at Midnight before the Noon of 25th Day of *December*, in the 4713th Year of the *Julian* Period, which was *Biſſextile*: The Cycle of the Sun 9, of the Moon 1, and *Dominical* Letters DC, in the 752d Year from the Building of *Rome*; the 42d Year of *Auguſtus Cæſar*; and in the Year of the Creation of the *World* 4001.—— Theſe three Accounts by Mr. *Rowe*, Mr. *Williams*, and Mr. *Maſon* are the *beſt* we have received; who are all three Competitors by Lot; whoſe Names being *fairly* wrote on three Pieces of Paper, and twice drawn by *Honorius* out of *Fidelia*'s Apron; the firſt Lot drawn of 4 Palladiums, came to Mr. *Williams* of *Hackney*; and the ſecond Lot drawn, of 2 Palladiums, to Mr. *Alexander Rowe*, of *Penzance*, *Cornwall* — *N. B.* Mr. *Maſon*'s Account is a Year before the vulgar Æra. And Mr. *Williams*'s Account in the 7th Year before.

ANSWERS to the QUESTIONS in the *Palladium*, for 1759.

I. QUESTION 146, *anſwered by the Propoſer*, Mr. Huntley.



In the Figure above,

DE repreſents the *Horizontal* Diſtance between the *Hill* and *Mountain*'s Foot.

H, the *Hill*-Top } A, the 1ſt Station.
C, the *Caſtle* } B, the 2d Station.

AB = Diſt. of the *two Stations* = 1000 Feet.

$\angle$ DAH = 8° 40′ } $\angle$ DBH = 6° 45′
$\angle$ EAC = 13 40 } $\angle$ EBC = 17 0.

The greateſt *Random* = 11640 Feet, = *twice* the *Impetus*, or greateſt Height.

$\angle$ DAH — $\angle$ DBH = $\angle$ AHB = 1° 55′ }
$\angle$ EBC — $\angle$ EAC = $\angle$ ACB = 3 20 }

Hence, by *Trigonometry*,

Feet
S. 1° 55′ : 1000 :: S. 6° 45′ : AH = 3514.253.
Rad. : AH :: S. 8° 40′ : DH = 529.5478.

Hence, EC = 1188.059.
FC = 658.5122.
AD = 3474.127.
BE = 3885.967.
DE = HF = 8360.094.
∠ FHC = 4° 30′ 13″.

By HOLLIDAY's *Principles* of GUNNERY.

As T. 45° : greateſt *Random* 11640 ::
T. ∠ Object's Elevation 4° 30′ 13″ : 916.8642 a 4th.
Horizontal Diſt. 8360.0940 add.

As gr. Rand. 11640 : Cos. Object's
Elevation 4° 30′ 13″ :: 9276.9582 Sum :

Cos. 37° 23′ 21″
85 29 47
———
122 53 8
Half 61 26′ 34 Comp. Elev^n.
28 33 26 ∠ of lower Elev^n. req^d.

To be added to the ∠ between the *Zenith* and *Object*, for the *Double* of the Comp. of Elev^n.

90°
4 30′ 13″ :
———
85 29 47 ∠ between *Zenith* and *Object*.

———
But 180°
Cos. 37 23′ 21″
———
Coſ. 142 36 39
85 29 47
———
doub. Comp. 228 6 26
Comp. 114 3 13
65 56 47
the *higher* Elevation.

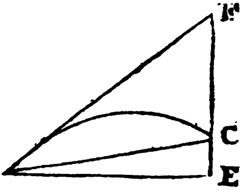
RULE *for* PROJECTILES *hitting Objects on Aſcents.*

As Rad 1 to the greateſt Random :: ſo Tangent of Object's Elevation : to a *Fourth*; add to which the *Horizontal* Diſt. then as the greateſt *Random* : to Coſ. of Object's Elev. :: ſo the *Sum* of 4th and *Horiz.* Diſt : to Coſ. of an Angle, which *added* to ∠ between the *Zenith* and *Object*, gives the *double* of the Complement of Elevation to hit the *Object*.

Mr. *Joſ. Wooſe*, of Mr. *Johnſon*'s School of *Hull*, ingeniouſly anſwered the ſame, by the very ſame Method. *Cheſterfieldienſis* makes the two Elevations 28° 25′ 25″, and 66° 6′ 6″, making DE the Hor. Diſt. = 8320.096 inſtead of 8360,094; but gives the Caſtle's Height, CE, and Hill's Height DH the ſame as Mr. *Huntley*. And from Number 179 *Philoſ. Tranſactions* gives this *Theorem* for finding the *Tangent* of Elevation $= t = \frac{p}{2b} \mp \sqrt{\frac{p^2 - 4ph}{4b^2} - 1}$ according to Dr. *Halley* (where p = the *Parameter* = double the greateſt Random; b = the *Horizontal* Diſt. h = Height of the *Object* above the *Level* of the Cannon, Rad. = 1) —— Mr. *Alexander Rowe*, of *Penzance*, *Cornwall*, after determining the preceding *Requiſites* very correctly, he as correctly finds the two Elevations, 28° 33′ and 65° 57′ to hit the Caſtle.

Mr. George Brown, *writing and* mathematical *Maſter at Portſmouth-Common, anſwers the ſame, as follows.*

PUT $a = 16\frac{1}{12}$ Feet, $b = 11640$, the Projectile's *greateſt* horizontal Random. Then, 'tis known $\sqrt{2ab}$ = the *Projectile*'s Velocity in 1 Second. But per Queſtion and *Trigonometry*, HE $= 8360{,}388 = c$; EC $= 658{,}6119 = d$; $x =$ Time of the Projectile in Motion. Then, CF $= ax^2$, and EF $= d + ax^2$; but $1^s : \sqrt{2ab} :: x :$ HF $= x\sqrt{2ab}$. Then per 47. E. 1. $c^2 + \overline{d+ax^2}|^2 = 2abx^2$; conſequently $x^2 = \frac{b-d\pm\sqrt{b^2-2bd-c^2}}{a}$; and by Trig.



$$c : b\pm\sqrt{b^2-2bd-c^2} :: \text{Rad. } 1. : \frac{b\pm\sqrt{b^2-2bd-c^2}}{c} = 2{,}24026$$

and ,54429, the Tangents of 65° 56′ 42″ and 28° 33′ 32″, the required Angles of *Elevation*.

See Jones's *Synopſis Palmariorum, P.* 296. *of the Motion of Projectiles. See alſo* Emerſon's *Principles of Mechanics*, 2d Edition, *from Page* 24 *to* 29.

☞ We ſhall give all the RULES of Projectiles (conciſely) hereafter.

II. QUESTION 147, *anſwered by* Cheſterfieldienſis.

PUT $x =$ 1ſt Term, then by geometrical Progreſſion, the laſt Term in the *Series* will be $x \times 2^{51}$, the *Ratio* being 2; conſequently the *Sum* of all $= x \times 2^{52} - x = 50000 = s$. Hence $x = \frac{s}{2^{52}-1} = \frac{48000000}{503599627370495}$, the Fraction of 1 Farthing, which is the 1ſt Payment. And the laſt Payment is 25000 *l.* = 24000000 Farthings and $\frac{24000000}{4503599627370495}$ *fractional* Part of a Farthing. Q. E. I.

Mr. *Thomas Huntley* ſolved it in the ſame *elegant* Manner, but in *Latin* Diction, the Reſult being exactly the ſame.

Mr. *Joſeph Wooſe*, of Mr. *Johnſon*'s School, in *Hull*, ſolved it likewiſe by the ſame Method, very *correctly*; as did Mr. *John Buddle*, at *Cheſter le Street*, near *Durham*; Mr. *George Brown*, Mr. *Edward Ellis*, at Mr. *Hicks*'s School, at *Reedneſs*, near *Howden*, *Yorkſhire*.

Mr. Alexander Rowe's *Solution is thus.*

If

a	denote	*Firſt Term*	. . . . .
r		*Ratio*	$r = 2$
n		*Num. Terms*	$n = 53$
l		*Laſt Term*	. . . . .
s		*Sum Terms*	$s = 50000$.

Then, $a = \frac{sr - s}{r^n - 1} = 0$, nearly.

$$l = \frac{sr^n - sr^{n-1}}{r^n - 1} = 25900\,l.$$ nearly.

See Jones's *Synopſis Palmariorum Matheſeos*, P. 202.

III. QUESTION 148, *anſwered by the* AUTHOR.

By Page 148, *Royal Aſtronomer and Navigator*, the Dominical Letters, at Sight, in the 585th Julian Year current before Chriſt, (always deducting 1 for Years before Chriſt) were FE, it being *Biſſextile*. And, by Page 149, *May* 28, that Year, anſwering to E, was on a *Wedneſday*, (*and not on a* Monday, *as in* Brent's *Aſtronomy*) when the Battle was put an End to, after an *Eclipſe*, and Peace enſued betwixt the *Medes* and *Lydians*. By Page 168, *Royal Aſtronomer*, the Days of New Style in 585th Year, before Chriſt, were backward of the Old by 6; according to this RULE;

Before Chriſt, take the Fourth *from the Hundreds — that done —*
Then add 2, *and the Difference of Style will be known.*

Thus, 5 Hundreds — their $\frac{1}{4}$, or — 1 = 4, to which adding 2, the Sum = 6 Days, the *New Style* was then before the *Old*, in Reſpect of the Month-Day. — Hence the 28th of *May*, O. S. was the 22d of *May*, N. S. in the 585th Year, current before Chriſt.

To find the Epact for any Year before or ſince Chriſt, O. S.?

RULE. Multiply the *Golden* Number for the Year by 11, and divide by 30, (if the Product is above) and the Remainder will be the *Epact* for that Year, O. S. required.

Or, adding the Number of Days *Difference* between Old and New Style to the Epact, in Years before Chriſt, or ſubtracting them therefrom (or after 30 be added) in Years ſince Chriſt, (according as the Month-Day of New Style is before or after the Month-Day of Old Style) and the *Sum* or *Remainder*, *reſpectively*, will be the *Epact* for New Style, *required*.

By *Table*, Page 150, *Royal Aſtronomer*, the Golden Number for 585 before Chriſt (always deducting 1 for Years before Chriſt) is 6, which multiplied by 11, and divided by 30, the Remainder is 6, the *Epact* for 585, O. S. And the Difference of Days between Old and New Style being then 6, (the Month-Day of New is before the Month-Day of Old Style) add them to 6, the Epact, O. S. the Sum is 12, the *Epact* for New Style, 585. — NOTE, *The* Epact *for New Style is always as much* more *or* leſs *than the* Epact *for Old Style, as the Month-Day of the New Style is* leſs *or* more *than that of the Old, and the* contrary, *for Old from thoſe of New Style.*

For the Days Difference of the Moon's Age (which is governed by the *Epact*) add, *when the Number of Days Difference of the Month-Day* ſubtract, *to and from thoſe of Old, for thoſe of New Style: And when the Month-Day adds, the Moon's Age ſubtracts, to and from thoſe of Old, for thoſe of New, Style. And the contrary in thoſe of the New, for thoſe of the Old, Style.*

The Cycle of the *Moon* is ſeen to be 6 for New and Old Style in the 585th Year before Chriſt.

And the Cycles of the *Sun*, and *Indiction*, are 19, and 4.

☞ The *Dominical Letters* for 585, before Chriſt, N. S. are GF, by *Table*, Page 149, *Royal Aſtronomer*, (always deducting 1 Year for Dates before Chriſt) where ample Satisfaction is had, and Rules for the Whole Buſineſs of Chronology.

To find the Cycle of the Sun before Chriſt.

RULE. Divide by 4 Sevens — The Date and 18,
Take what's left from 4 Sevens — the Cycle is ſeen.

To find the Indiction before Chriſt.

RULE. Divide by 15 — the Date and 12,
Take what's left from 15 — the *Indiction* is given.

The 1ſt Day of the *Egyptian* Year in the Month *Thoth*, happened on the 26th of *February*, in the 746th Year current before Chriſt, *Julian* Style; being the Æra of *Nabonaſſar*, (ſee Page 157 of our *Royal Aſtronomer*) from whence to *February* 26, 585, before Chriſt, there are 161 *Egyptian* Years and 40 Days, and from *February* 28 to *May* 28, are 92 Days more (585 being Leap-year). Hence there are 161 *Egyptian* Years and 132 Days from the 1ſt of the Month *Thoth*, making the 12th Day of the *fifth Egyptian* Month *Tybi*, required, correſpondent to the Julian Date given. (*See Page* 141, *Royal Aſtronomer*.)

Mr. *Huntley* has determined the Golden Number and Epact, Dominical Letters, Cycle of the Sun, and Indiction, for Old Style, the ſame as above; as did Mr. *W. Williams*, of *Hackney*.

IV. QUESTION 149, *anſwered by Mr.* Alexander Rowe.

By falſe Poſition, Sir, it plain appears,
Your Friend is aged ſeven and forty Years.

Anſwered by Mr. George Brown, *of* Portſmouth.

PUT x = Mr. *Stapley*'s Age, then $1758 - x$ = Year of our Lord he was born in; and per Queſt. $1759x - x^2 = 80464 = m$; $b = 1759$.

Whence, $x = \frac{b \pm \sqrt{b^2 - 4m}}{2} = 1712$; and 47 Years his Age.

By *Cheſterfieldienſis*. Put $p = 1758$, and $x =$ his Age *ſought*; then $p - x =$ the Year he was born in: and $\overline{px - x^2} + x = 80464 = s$. Put $p + 1 = 2d$, then $x = \pm \sqrt{d^2 - s} + d = 47$ Years, his Age.

By Mr. *Joſ. Wolfe*, of *Hull*. Put $x =$ Year he was born in, $y =$ Year when the Queſtion was propoſed; then $y - x =$ his Age; put $a = 80464$;

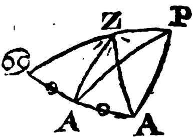
Then, $y - x \times x, + y - x = a$ or $y - x \times \overline{x + 1} = a$;

whence $y - x = \frac{a}{x + 1} = 47$ Years, his Age, (a Rule of *Trial*.)

Explicatio à Dom. Thom. Huntleio. *Eſto Quantitatis* x = *Auctoris Ætati*, a = *Anno nuperrimè completo*, viz. 1758, $s^2 = 80464$, *et ex Conditione Problematis*, $\overline{a-x} \times x, + x = s^2$; *ſit autem Brevitatis Gratiâ*, $a + 1 = c$, *dein Subſtitutione et Reductione factâ, prodit* $x = \frac{1}{2}c - \sqrt{\frac{1}{4}c^2 - s^2} = 47$.

Mr. *Robert Romney*, Pupil to Mr. *George Hicks* of *Reedneſs*, in *Yorkſhire*, elegantly anſwered the ſame in *Latin* Diction. Mr. *Thomas Hall* alſo ſolved it, as did Mr. *Edward Ellis*, Mr. *Thomas Sadler*, and ſeveral others. But we have inſerted the principal Methods of Solution, for the *Analyſt*'s Satisfaction.

V. QUESTION 150, *anſwered by the* Indefatigable Cheſterfieldienſis.



IN *Palladium*, 1757, the Sun's Declination, *May* 12, was 18° 19′ N. whoſe natural Sine call d; its Coſine c; the ∠ ♋ZA = the Sun's Azimuth at 2d Obſervation = 46° 15′; and ∠ ♋ZA, the Sun's Azimuth at 1ſt Obſervation = 77° 20′; and ∠ APA = 2 Hours = 30°. *Then*, in ∠ APA, you have given AP = AP = ♋P = 71° 41′; and included ∠APA = 30°, to find AA = 28° 26′ 50″; and ∠ A♋P = $\angle \underline{\text{AAP}}$ = 85° 27′ 57″. *Again*, put x = Sine ♋A, and its Coſine $\sqrt{1-x^2}$; g = Coſ. ∠ A♋P, Then, by a known *Theorem* $xgc + d\sqrt{1-x^2} = d$; hence $x = \frac{2dgc}{d^2 + c^2 g^2} = ,4776333$, and ♋PA = ,5013392, anſwerable to 30° 5′ 19″, or $2^h\ 0^m\ 21^s$ of Time from Noon, the Time of 2d Obſervation: And $4^h\ 0^m\ 21^s$ from *Noon*, the Time of 1ſt *Obſervation*.

By Spherics, As Rad. : Tan. AZ, 41° 12′ 47″ :: Coſ. ∠AZ♋, 43° 45′ : Tan. 31° 12′ 4″.

As Tan. 30° 5′ 19″ : Sine 31° 12′ 4″ :: Tan. 46° 15′ : Sine ♋° 3′ 44″.

Now, ♋° 3′ 44″ − 31° 12′ 4″ = 37° 51′ 40″, Complement of Latitude. Whence the Lat. 52° 8′ 20″. Q. E. I.

Mr. *John Buddle* gave the ſame Method of *Solution*, but found no Numbers.

VI. QUESTION 151, *anſwered by the* AUTHOR *of the* Royal Aſtronomer *and* Navigator.

OUR Correſpondent informing us of a Miſtake, of 1759 printed for 1760, and other Blunders, we have rectified them.

☽ paſſes *Paris* Merid.		☽'s Declin.		☽'s *Place.*	
$20^d\ 8^h\ 46^m$	52^m Dif.	23° S. 33′	2° 47′ Dif.	1° ♒ 38′	12° 47′ Dif.
21 9 38		20 46		14 25	

See De la Caille's Ephemerides, Sept. 1760.

Say, 360° : 12° 47′ Dif. ☽'s Place :: 71° 10′ W. from *Paris* : 2° 32′ Dif. ☽'s Place at N. *England*.

Sept.

	At *Paris.*		☽'s Pl. at N. *Eng.* Noon.	
Sept. 20	1° ♒ 38′	+ 2° 32′ =	4° ♒ 10′	12° 47′ Dif.
Noon 21	14 25	+ 2 32 =	16 57	

Again, As 360° : 52m ☽'s later Southing :: 71° 10′ : 10m 17s Southing, later at *N. England.*

Sept. 20d. 8h 46m | + 10m 17s = 20d 8h 56m 17s } ☽ passes *N. Eng.*
21 9 38 | + 10 17 = 21 8 48 17 } Meridian.

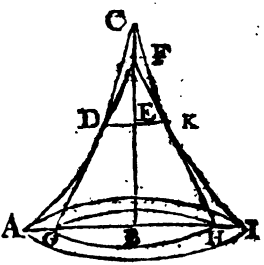
Incr. ☽ Pl. Incr. ☽ Pl. ☽ Pl.
Again, 24h : 12° 47′ :: 8h 56m 17s : 4° 45′ } Whence } 8° ♒ 55′
9 48 17 : 5 13 } } 22 10
When the ☽ souths [at *N. Eng.*

Decr. ☽ Decl. Decr. ☽ Decl. ☽ Decl.
And 24h : 2° 47′ :: 8h 56m 17s : 1° 2′ } Whence } 21° S. 58′
9 48 17 : 1 8 } } 19 5
When the ☽ souths [at *N. England.*

Alſo, 360° : 2° 47′ :: 71° 10′ : 33′. Whence, } 20d } 23° S. 0′ 2° 47
Sept. } 21 } 20 13
at *Noon.*

☞ *The above Solution* is all that could be *meant*, or was indeed conſiſtent; however 1759 came to be *ſent us for* 1760, and *January the 8th printed for September the 20th.* So that if Contributors do not ſend *Solutions* with their *Queſtions* for the future to prevent *Blunders* and *Abſurdities*, they will not be inſerted.

VII. QUESTION 152, *anſwered by Mr.* GEORGE BROWN, *of* Portſmouth-Common.

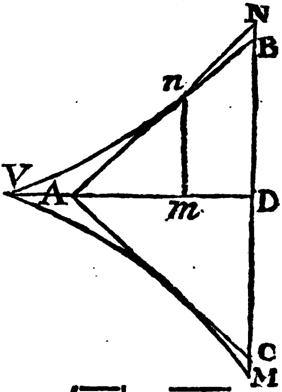


LET CB = 50 = b, BA = 35 = c, p = ,7854, and the *Equation* of the Curve, and the Equation of the Curve CDA is $ax^3 = y^2$. Then, FE = $\frac{2}{3}x$, and IB = $\frac{3b - x}{3}$;

Then, as EF : ED :: FB : BG = $\frac{\overline{3b - x}\sqrt{ax}}{3}$; ∴ $\frac{pax}{9} \times \overline{3b - x}|^3$ = Solidity of the Cone FDGHKF, which, *per Queſt.* muſt be a *Maximum*, or $3bx^{\frac{1}{3}} - x^{\frac{4}{3}}$ a *Maximum.* In Fluxions, $\frac{b\dot{x}}{x^{\frac{2}{3}}} - \frac{4}{5}x^{\frac{1}{3}}\dot{x} = 0$; whence $x =$

$\frac{1}{4}b$; conſequently, BF $= \frac{1}{4}b = 39.5$; GH $= \frac{9c}{8}\sqrt{\overline{3}} = 68.1995$; and Solidity $\frac{243}{256}pbc^2 = 45662.87988$. Q. E. I.

The PROPOSER'S SOLUTION, *Mr.* John Thomſon's, *of* Wetherby Bridge, Leiceſterſhire.



THE *Subtangent* A*m* will be found to be $\frac{2}{3}$ of the *Abſciſſa* V*m*, therefore the Curve is convex towards its *Axis*.

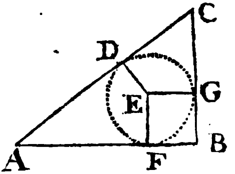
Hence, putting VD $= 50 = a$, DN $= 35 = b$, and V*m* $= x$, then VA $= \frac{x}{3}$ ∴ AD $= a - \frac{x}{3}$ and (*per Curve*) $a^3 : b^2 :: x^3 : \frac{b^2x^3}{a^3} = \overline{nm}|^2$ ∴ $b\sqrt{\frac{x^3}{a^3}}\Big| = nm$, and (*per* ſim. Δs) $\frac{2x}{3} : b\sqrt{\frac{x^3}{a^3}}\Big| :: a - \frac{x}{3}$: BD $= b\sqrt{\frac{x^3}{a^3}}\Big| \times \overline{\frac{3a}{2x} - \frac{1}{2}}$ ∴ BC $= \frac{bx}{a}\sqrt{\frac{x}{a}}\Big| \times \overline{\frac{3a - x}{x}} = \frac{b}{a}\sqrt{\frac{x}{a}}\Big| \times \overline{3a - x}$, and $\overline{BC}|^2 = \frac{b^2x}{a^3} \times \overline{\overline{3a - x}}|^2$ ∴ $x \times \overline{\overline{3a - x}}|^2 \times \overline{3a - x}$ or $x \times \overline{\overline{3a - x}}|^3$ is a *Maximum*; which fluxed and reduced gives $x = \frac{3a}{4}$ = AD = 37,5, BC $= \frac{9b}{8}\sqrt{\overline{3}}| = 68{,}1975$, and the *Content* $= 45669{,}9203$. W. W. R.

The *Maximum* of Solidity by *Cheſterfieldienſis* being but 27059.48, we therefore omit his Solution.

VIII.

VIII. QUESTION 153, *anſwered by Mr.* Alexander Rowe.

GIVEN $AC = xx$, $DE = FE = GE = 3x$; $AC + 2DE = AB + CB = x^2 + 6x$; Then $AC^2 = \frac{\overline{AB+CB}^2}{2} + AC$; *i.e.* $x^4 = \frac{\overline{x^2+6x}|^2}{2} + xx$;



Whence, $2x^4 = \overline{x^2+6x}|^2 + 2x^2$; and by *Reduction*, $x^2 - 12x = 38$; but *becauſe* x is to be a whole Number, *&c.* $x^2 : 12x :: 5 : 4$; from whence $x = 15$ (the leaſt whole Number). And thence $AC = 225$; $AB = 180$; and $BC = 135$, anſwering the Conditions of the Queſtion. Q. E. I.

Cheſterfieldienſis ſolved the ſame Queſtion by another Method; but not ſo *general.* He found the Value of the *Hypothenuſe*, leſs and greater Legs, the ſame as above. Mr. *Joſeph Wooſe*, of Mr. *Edward Johnſon*'s School, at *Hull*, ſolved the ſame; as did ſome others.

IX. QUESTION 154, *anſwered by* Cheſterfieldienſis.

PUT x for the leaſt Side, $x + e$ for the next Side, $a + 2e$ for the greater Side, then, by the *Queſtion*, as $x^2 + xe : x^2 + 3xe + 2e^2 :: 1 : 3$, or which is the ſame $x : x + 2e :: 1 : 3$; hence, $a = e$; conſequently the 3 Sides are x, $2x$, and $3x$. By the *Queſtion*, $6x^3 \times 6x^3 \times 6x^3 = 2176782336$; whence $x = \overline{\frac{2176782336}{216}}|^{\frac{1}{9}} = 6$; and the other Sides 12 and 18.

☞ *But becauſe the Sum of the two leſs Sides are equal to the greater, this Triangle cannot exiſt. Which Diſcovery therefore anſwers the Trouble of propoſing the Queſtion.*

Mr. *Rowe* anſwered this *Queſtion*, and made the ſame Obſervation; as did Mr. *John Buddle*, Mr. *Robert Romley*, Mr. *Edward Ellis*, Mr. *Joſeph Wooſe*, and others. Mr. *Huntley* amended the *Conditions*, and ſolved it very curiouſly, as follows.

Fiat $x =$ *lateri primo ſeu minimo trianguli* $x + z =$ *ſecundo ſeu Medio*, $x + 2z =$ *tertio ſeu maximo, tum per conditionem problematis ſecundam aptè emendatam* (liquet enim typorum diſpoſitio rem in errorem heic incidiſſe) $x \times x + z : x + z \times \overline{x+2z} :: 1 : 2$ ∵ $2x^2 + 2xz = x^2 + 3xz + 2zz$. *Unde* $x = \frac{1}{2}z + \sqrt{\overline{\frac{1}{4}x^2 + 2z^2}} = 2z$, *quare* $\overline{x} \times \overline{1\frac{1}{2}x} \times 2x = 3x^3 = \overline{2176782336}|^{\frac{1}{3}}$. *Diviſione factâ et radice utrobique extractâ, prodit* $x = \overline{80621568}|^{\frac{1}{9}} = 7,559525$; *ideoque* $x + z = 11,339287$, *et* $x + 2z = 15,119049$.

Inventis nunc ſingulis trianguli lateribus, capacitas agelli, ope ſcilicet Emerſonii *clariſſimi theorematum* 7^{mi} *et* 13^{i} Lib. II. *facillimi ſic eruitur.*

1 : ,6875 :: S. 90° : Coſ. 46° 34′ 3″.
S. 90° : S. 46° 34′ 3″ :: $x^2 = 57,14645 : 41,49886$.
Ut : quadratis, ſive 4 jug. et 25 perticis. Q. E. I.

X. QUESTION 155, *anſwered by* Cheſterfieldienſis.

FIRST, As 9 Inches : 58 Stitches :: 133 Inches Length (= 3 *yds.* 2 *feet*, 1 *inch.*) : $857\frac{1}{9}$ Stitches, in 1 *Row*. Now, 28 Inches Breadth (= $\frac{1}{2}$ yard and 10 inches) divided by ,4 gives 70 Sides of ☐s; being 1 leſs than the *Rows*, in Breadth, as well as Length. *Therefore*, $857\frac{1}{9}$ *Stitches* in Length, by 71 *Rows* in Length gives $60854\frac{8}{9}$ Stitches in Length.

Again; As 9 Inches : 58 Stitches :: 28 Inches Breadth : $180\frac{4}{9}$ Stitches in Breadth, which multiplied by the *Rows* in Breadth $333\frac{1}{2}$ (= 133 Inches ÷ ,4, adding 1 to the *Quote*) and the Product is $60178\frac{2}{9}$, the Stitches in Breadth, which added to $60854\frac{8}{9}$, the Stitches in Length make $121033\frac{1}{9}$ Stitches in the *Petticoat*. Now, As 1000 *Stitches* : 25*l.* :: $121033\frac{1}{9}$ *Stitches* : 30*l.* 5*s.* 2*d.* *nearly*, the Coſt of the Job. Q. E. I.

Mr. Alexander Rowe *ſolves it thus.*

133 (Inches the Length) × 28 (Inches in Breadth) = 3724 ſquare Inches, the *Area*; which ÷ ,16 the Area of 1 quilted Square, the *Quotient* is 23275 the Number of *quilted Squares* in the whole Work; each of which Squares being wrought ,4 in Length and Breadth, ,8 is to be counted for Work in *every Square*, beſides the *half Circuit*, at the Border, or Length and Breadth to be *added*. — Now, 23275 × ,8 = 18620 Inches of Work in all the Squares; to which adding 133 + 28 = 161 Inches for the half Border, and the *Sum* = 18781, *wrought Inches*.

As 9 : 58 :: 18781 : $121033\frac{1}{9}$ *Stitches* of Work, as before.

☞ *The* French *Quilting may amount to* 10 *Guineas*; *but extraordinary Stitching amounts to more, for Ladies. And why not* 30*l. for a* Petticoat, *as well as* 50 *for a* Head-Dreſs?

Mr. *John Buddle* anſwered the ſame *very conciſely*. Mr. *Robert Romley*, Mr. *Edward Ellis*, both of Mr. *Hicks*'s School, at *Reedneſs*; and ſome others.

XI. QUESTION 156, *anſwered by Mr.* John Buddle, *of* Cheſter le Street, *near* Durham.

LET the Ages of *Scurrilla*, *Clamora*, and *Clangoſa*, be repreſented by x, y, and z.

$$\begin{array}{r|c|l}
\text{Then,} & 1 & \left.\begin{array}{l} xx+zz-2zy+yy = 754 \\ yy+zz-2zx+xx = 1394 \\ zz+yy-2yx+xx = 1664 \end{array}\right\} \textit{per Queſtion.} \\
 & 2 & \\
 & 3 & \\
2-1 & 4 & 2zy-2zx = 640;\ \because zy-zx = 320. \\
3-2 & 5 & 2zx-2yx = 270;\ \because zx-yx = 135. \\
3-1 & 6 & 2zy-2yx = 910;\ \because zy-yx = 455. \\
\text{By } 6. & 7 & y = \dfrac{455}{z-x}. \\
5. & 8 & y = \dfrac{zx-135}{x}.
\end{array}$$

7 = 8

7 = 8	9	$\frac{455}{z-x}=\frac{xx-135}{x}$.

Years.
By a few Trials, the Value of x is found = 27 *Scurrilla*'s }
Whence, 35 *Clamora*'s } Age.
40 *Clangoſa*'s }

Enodatio, à Dom. Huntleio.

	1	$x^2+y^2-2yz+z^2=754$ } *per Data.*
	2	$y^2+x^2-2xz+z^2=1394$ } *per Data.*
	3	$z^2+y^2-2xy+x^2=1664$ } *per Data.*
$2-1\div 2$	4	$2yz-2xz=640$, *et* $yz-xz=320$.
$3-2\div 2$	5	$2xz-2xy=270$, *et* $xz-xy=135$.
$4\div\overline{y-x}$	6	$z=\frac{320}{y-x}$.
5 trans x $\div x$	7	$z=\frac{135-xy}{x}$.

His valoribus z *inter ſe æquatis, et æquatione concinnatâ, obtinemus hanc,* $x^2-yx+\frac{455}{y}x=135$.

Ex equatione primâ liquet, quantitatem x *non excedere* $\sqrt{754}=27$, *nec quantitatem* y *ſuperare* $\sqrt{1394}=37$: *Oportet ergo valorem* y *intra hos limites exiſtere; debet porro valor* y *eſſe numerus integer. ſolus autem numerus, nec minor* 7, *nec major* 37, *per quem* 455 *dividi poteſt, eſt* 35; *valor* y *ergo erit* 35 = *ætate* Clamoræ; *qui numerus ſubſtitutus in* æquatione *noviſſimâ, exhibet hancce* $x^2-35x+13x=135$, *unde prodit* $x=27=$ *ætate* Scurrillæ, *et* $z=40=$ *ætate* Clangoſæ. Q. E. I.

Anſwered by Mr. George Brown, *of* Portſmouth-Common.

PUT x, y, and v, the Ages of the three Vixens, *Scurrilla*, *Clamora*, and *Clangoſa*.

Then per Queſt.	1	$x^2+\overline{y-v}\,\vert^2=754=a$.
	2	$y^2+\overline{x-v}\,\vert^2=1394=b$.
	3	$v^2+\overline{x-y}\,\vert^2=1664=c$.
Whence	4	$2yv-2xv=b-a$.
But	5	$v^2\times\overline{x-y}\,\vert^2=c$.
Then	6	$\overline{x-y}\,\vert^2=c-v^2$.
And	7	$v^2+\overline{x-y}\,\vert^2+2yv-2xv=c+b-a$.
Therefore	8	$x+y-x=\sqrt{c+b-a}$.
And	9	$\overline{x-y}\,\vert^2=\overline{v-\sqrt{c+b-a}}\,\vert^2$.
Conſeq.	10	$\overline{v-\sqrt{c+b-a}}\,\vert^2=c-v^2$.
Or	11	$v^2-v\sqrt{c+b-a}=\frac{a-b}{2}\ \therefore\ v=$

$$\frac{\sqrt{c+b-a}+\sqrt{c+a-b}}{2}=40.$$

From what is done above,

$$\left.\begin{array}{l} & \text{Years.} \\ x = 27 \\ y = 35 \\ v = 40 \end{array}\right\} \text{Age of} \left\{\begin{array}{l} \\ \textit{Scurrilla.} \\ \textit{Clamora.} \\ \textit{Clangosa.} \end{array}\right.$$

All abounding in *Excellence!* of which Mr. *Hammond* may take his Choice!

Thus, Mr. *Brown* has curiouſly wrought out the *final Equation*, by a *Quadratic* only.

Curiouſly anſwered by Mr. WOOFE, *at Mr.* JOHNSON'*s School, in* Hull.

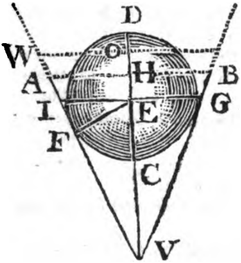
PUT x, y, and z, for the Ages of *Scurrilla*, *Clamora*, and *Clangoſa*.

Then *per* Queſt.	1	$x^2 + z^2 - 2yz + y^2 = 754 = a$
	2	$y^2 + z^2 - 2zx + x^2 = 1394 = b$
	3	$z^2 + y^2 - 2xy + x^2 = 1664 = c$
2 — 1	4	$2yz - 2zx = b - a \therefore y - z = \frac{b-a}{2z}$ and $\overline{y+x}\vert^2 = \frac{\overline{b-a}\vert^2}{4z^2}$
3 — 1	5	$2yz - 2xy = c - a \therefore z - x = \frac{c-a}{2y}$, and $\overline{z-x}\vert^2 = \frac{\overline{c-a}\vert^2}{4y^2}$
In 1, 2, 3, ſubſtitute for Equals.	6	$x^2 + \frac{\overline{c-b}\vert^2}{4x^2} = a$; $y^2 + \frac{\overline{c-a}\vert^2}{4y^2} = b$; $z^2 + \frac{\overline{b-a}\vert^2}{4z^2} = c$;
6 reduced.	7	$x = \sqrt{\frac{a}{2} \pm \sqrt{\frac{a^2}{4} - \frac{\overline{c-b}^2}{4}}} = 27$ Yrs. Age of *Scurrilla.*
	8	$y = \sqrt{\frac{b}{2} \pm \sqrt{\frac{b^2}{4} - \frac{\overline{c-a}^2}{4}}} = 35$ Age of *Clamora.*
	9	$z = \sqrt{\frac{c}{2} \pm \sqrt{\frac{}{4} - \frac{\overline{b-a}^2}{4}}} = 40$ Age of *Clangoſa.*

Mr. *George Hicks* of the *Devizes* anſwered the ſame; as did Mr. *George Stapley* the Propoſer, *Cheſterfieldienſis*, and ſome others.

XII. QUESTION 157. *Anſwered by Mr.* Alexander Rowe.

LET DC repreſent the Diam. of the *Ball* = 4 Inches = a; EC that Part of it = the Altitude of the Water, after the *Ball* is put into the Glaſs, = x; AB, the Diam. of the *Glaſs* = 5 Inches = b; Content of the *Water*, in the Glaſs = 19.635 Sq. Inches, = c, and ,7854 = d. *Then*, ED = $a - x$; and *per* the *Circle's Property*, DE × EC = EG², *that is*, $ax - x^2 = \square$ of the Radius of the *Plane of the Section of the Ball*, at the Place of *Immerſion* in the Water; the *Area* of which Plane = $5dax - 5dx^2$, which divided by $\dot{x}$, = $5dax\dot{x} - 5dx^2\dot{x}$ = *Fluxion* of the Ball's Segment *under Water*; whoſe *Fluent* is $2.5dax^2 - \frac{5}{3}dx^3 + c = db^2x$, *nearly* (in the preſent *Caſe*) $\therefore \frac{5}{3}dx^3 - 2.5dax^2 + db^2x = c$; whence, $x^3 - 1.5ax^2 + \frac{3}{5}b^2x = \frac{3c}{5d} = 15$; from which, $x = 2.33$ Inches, *ferè*. Q E I.



The ſame anſwered by Mr. George Brown, *Mathematical and Writing Maſter, at* Portſmouth *Common.*

PUT p = ,7854; As AH; AV :: (2.5 : 6.5) $c : b$; FE = 2 Inches = d; VH = 6 Inches = n; C o = x, the Height of the Segment immers'd (*ſuppoſing the Sides of the Glaſs continued above the Top*, AB) Vo = y, the Water's Height by the Ball's Immerſion. (*Here the Water is ſuppoſed to be above the Top of the Glaſs which otherwiſe may be conſidered as a Column of the Height* Ho, *running over*)

By *ſimilar* Δs $c : b :: d$: VE $= \frac{db}{c} = 5.2$; then, Eo $= y - \frac{bd}{c}$; and Co $= x = d + y - \frac{bd}{c} = y - 3{,}2 = y - m$, or $y = m + x$ (where $m = 3.2$.) By a *common Rule* $\frac{4p}{3} \times \overline{3dx^2 - x^3}$ = *Solidity* of the Segment *immerſed*. And $n : c :: y$: ow $= \frac{cy}{n}$. Then the Content of the *conical Space*, from the Bottom of the *Glaſs*, up to ow, above the Top of the Glaſs BA, $= \frac{4pc^2}{3n^2} \times \overline{3dx^2 - x^3} + \frac{2pc^2n}{3} = \frac{4pc^2}{3n^2} \times \overline{m + x}|^3$; whence $84.5x^3 - 312x^2 + 384x = 940.4$; ſolved $x = 3.331043766428$ Inches, true to the laſt *Figure*, the required Height of the Segment of the Ball Co, immerſed in the Water, (*if the Height of the Column*, Ho, *above the Glaſs be not run over?*) and therefore $Vo = 6.53104376242 8$ Inc. the Height of the Water, *if the Sides of the Glaſs were continued.*

We leave the Difference of theſe Solutions to be examined.

Cheſterfieldienſis ſubſtitutes x for the Height of the Water's Surface, from the Bottom of the Glaſs, after the Immerſion of the Ball's Segment; and Proportions thus; As 6 Inches, the Glaſs's Height : 5 Inches its Diameter :: x : $\frac{5}{6}x$ Inches Diameter *for* $\frac{1}{2}$ *the Glaſs's Content* — But is the Diameter (*as we conceive*) for the Glaſs's Content to the Top of the Water's Surface being above half the Glaſs's Content, by as much as the *immerſed Segment* exceeds $\frac{1}{2}$ the Content: *We therefore omit this Solution.*

XIII. QUESTION 158. *Anſwered by* Morris Muckworm, Eſq; *an* Exchange-Broker.

Original Debt 500 *l.*
Paid down 1 1

Remaining *Debt* 498 19

Hence at the End of	Years.	Payments.		Preſ. Worth.		
	1	*l.* 3	3 *s.*	*l.* 3	0	0
	2	9	9	8	11	5,14
	3	28	7	24	9	9,55
	4	85	1	69	19	5
	5	255	3	199	18	4
	5·247 *&c.*	117	16	91	3	10,50
Whole Debt		498	19	397	2	10,19

According to the Theorems in the following Page.

Whole preſent Worth required.

In a *Geometrical* Progreſſion,

Put $s = 498,95$ *l.* the Sum of the Terms.
$r = 3$, the *Ratio* in Years.
$a = 3,15$ *l.* the 1*ſt* Term.
$n = ?$ req^d.

By *Jone's Synopſis Palmariorum, p.* 201.

$$n = \frac{L.\overline{r-1} \times \overline{s+a} : - L.a}{L.r} = \frac{L,1904.2; - L.3,15}{L.3} =$$

5·24711347 *ferè.* Where L. denotes *Logarithm.*

By *Corol.* I. *p.* 200. $l = a \times r^{n-1} = 3,15 \times 3^{4\cdot24711347} =$ 334·7333 = 334 *l.* 14 *s.* 8 *d*: But as n is a broken N°. this Value of l will but partly anſwer the *Conditions* of the Queſtion, which is now *reduced to,*

What is a Debt of 498 *l.* 19 *s. worth in* ready Money, *payable, as above, at the End of* 5,24711347 *Years, at three Times as much at each Year's End as was paid at the End of the former Year; allowing,* 5 *per Cent Compound* Intereſt *for the Money paid down to the Time of each Payment; except ſimple Intereſt for the Payment at the* 1*ſt Year's End?*

Now, if p = Principal put out, or *Sum* forborn.
n = N°. of Years, or *Parts* of a Year.
r = *Rate* of 1 *l.* *per* Year, = ,05.
m = Amount of the ſaid Principal, for the Time n, at that *Rate*, r.

Then, the preſent Work, $p = \frac{m}{1 + rn}$ allowing *ſimple Intereſt.*

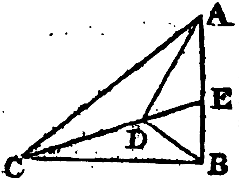
And if $x = 1 + r = 1{,}05$; Then, preſent Worth, $p = \frac{m}{x^n} = L.m - L.x \times n$, allowing *Compound Intereſt.* From which *Theorems* † the ſeveral preſent *Worths* are deduced, as *above* *.

Mr. *Buddle* made the Time of Payment 5 Years and 1 Month, laſt Payment 117 *l.* 16 *s.* nearly.

☞ OUR Correſpondents, in *general*, miſtaking the Conditions of the Queſtion, ſent their Anſwers wide of Truth. The *preſent Worth*, (as they ſent) being not what Sum will amount to, at compound Intereſt, 498 *l.* 19 *s.* in the Term of Years when the laſt Payment is to be made; but is the *Sum* of the *ſeveral preſent Worths* of each reſpective Payment, and Times of Payment. Or the *Sum* of the ſeveral Purchaſes of ſo many Debts payable at certain and different Times. For, tho' the *Diſpoſer* of his Debt, putting out his *ready Money* at continual or *Compound* Intereſt for the Time, at which the laſt Payment is to be made, will make it amount thereby to more than his Debt; yet the *Buyer* putting out his *Money* at compound Intereſt, as received, it will amount thereby to an equal Value, and alters not the Value of the ſeveral preſent Worths, or *Sum* of all.

XIV. QUESTION 160. *Anſwered by Mr.* Alexander Rowe.

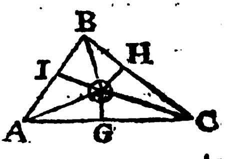
LET A, B, and C, repreſent the *three Fires*; from C, draw CE, at any ∠ with CB; let D be the required *Place*. Put $a = 40$ = CB; $b = 50$ = CA; c = Coſ. ∠BCD = 72°; (for I take ∠C = 18°) m = (that of ACD =) 71° 8′; and x = CD. Then, $\overline{AD}^2 = b^2 + x^2 - 2bmx$; and $\overline{DB}^2 = a^2 + x^2 - 2acx$. The *Laws* of Light and Heat, are in the *reciprocal Ratio* of the Diſtances from the Fires; the Magnitudes of the Fires, nor their Ratios of Heat being given, they are ſuppoſed equal) Hence, $x^2, + \overline{a^2 + x^2 - 2acx} + \overline{b^2 + x^2 - 2bmx}$, for the Strength of Heat, at D, a *Minimum.* In Fluxions and reduced, $x = \frac{mb + ca}{3} = 28{,}45198$; Whence, AD = 24,843, &c. DB = 1′51.6448 Yds.



— Hence, a very uſeful *Corollary* may be drawn.

The ſame anſwered by Cheſterfieldienſis.

LET A, B, C, repreſent the 3 Fires; and ⊙ the Point ſought; let fall the Perpendiculars, H⊙, I⊙, and G⊙; and put $d = 50$ = AC; C = 30 = AB; $g = 40$ = BC; and x = GC, variable, while G⊙ is *conſtant*, which call y. Then will $\frac{1}{x^2 + y^2} + \frac{1}{d - x^2 + y^2}$ expreſs the Heat of the Fires at A and C, which are to



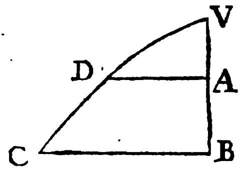
be a *Minimum*, at the Point ⊙; In *Fluxions*, (when $y = 0$) $= \frac{-2x\dot{x}}{x^4} + \frac{2d\dot{x} - 2x\dot{x}}{\overline{d-x}|^4} = 0.$

Hence, $x = \frac{d}{2}$; Conſequently AG = GC; and alſo by ſubſtituting c for d, AI is equal to IB; and ſubſtituting g for d, BH is equal to HC. But △*s*A⊙G and G⊙C, having AG and G⊙ common, as alſo ∠⊙GC = ⊙GA, being right angled by *Conſtruction*; therefore, △A⊙G = G⊙C, (E.4.1) Alſo, △AI⊙ = △IB⊙; B⊙H = H⊙C; *conſeq.* A⊙ = B⊙ = C⊙. — Hence the Point ⊙ is the Center of a Circle paſſing thro' the 3 given *Fires*; E.9.3. But, becauſe the □ of AC (= 2500) = *Sum* of the □s AB and BC (= 900 and 1600) *per Queſt.* Therefore △ ABC is right ∠d at B; and *conſeq.* the Point ⊙ will fall in the *Middle* of AC, the Diam. of the Circle; and the Diſt. required = 25 Yds. being half AC, by the Nature of the Circle; E.31.3. Q. E. I.

Scholium. The Heat at B may be expreſſed by $1 + \frac{1}{\overline{AB}^2} + \frac{1}{\overline{BC}^2}$ and the Heat at A, by $1 + \frac{1}{\overline{AB}^2} + \frac{1}{\overline{AC}^2}$; at C, by $1 + \frac{1}{\overline{AC}^2} + \frac{1}{\overline{BC}^2}$; conſequently the *greateſt Heat* from all the Fires will be in the Fire, at B, a *Maximum.*

Mr. *Bevil* makes another Thing in his Solution of this Queſtion; but as he has wrought out no Numbers to his intricate final Equation, and made no Concluſions, we omit his Anſwer.

XV. QUESTION 160, *anſwered by Mr.* G. Brown *of* Portſmouth-Common.



LET VB repreſent the Height of the Ship's *Maſt*; BC perp. thereto. Then it is evident, the Ball in its *Deſcent* to the Deck, at C, will deſcribe (by the compound Force of Gravity and the Ship's forward Motion) the Curve VDC. — Put t = Time of the Ship's ſailing, while the *Ball* deſcends to the Deck: AD = d; VA = b; VB = x, and BC = y. Then $d : t :: y : \frac{ty}{d}$ = Time of ſailing over BC.

By the Nature of falling Bodies, $t^2 : b :: \frac{t^2y^2}{d^2} : x$; ∵ $\frac{d^2}{b}x = y^2$: Hence, the Curve VDC is the *Common Parabola* (ſuppoſing no Reſiſtance of *Medium*) whoſe *Vertex* is V, and Parameter $\frac{d^2}{b}$.

Put $y = 302{,}1$ Inches $= 1{,}007 \times 25 \times 12 =$ BC; $x = 344.25$ Inches = BV: Then, *per* Fluxions, $\frac{\dot{y}\sqrt{\frac{1}{4}p^2 + y^2}}{\frac{1}{2}p}$ = the Fluxion of the Curve VDC; put $b =$

$\frac{1}{2}p$, and it may be transformed to $\frac{\frac{1}{2}by\dot{y}+y^3\dot{y}}{b\sqrt{b^2y^2-y^4}}+\frac{\frac{1}{2}b\dot{y}}{\sqrt{b^2+y^2}}$, whoſe *Fluent* corrected will be $\frac{\frac{1}{2}y\sqrt{b^2+y^2}}{b}+1.15129\ b\times\text{Log.}\frac{y+\sqrt{b^2+y^2}}{b}=$ 553,1954 Inches = 46,0996 *Feet*, the required Length of the Curve VDC, the Diſtance deſcended by the *Six Pounder* from the Maſt Head of the Ship *Neptune* to the Deck. Q. E. I.

Cheſterfieldienſis ſolved it by the ſame Kind of *curious* and correct Proceſs, determining the N°. of Inches deſcended by the Shot = 553,2
567.42 Inches computed in
Error 14.22 Diff. [L. Diary, 1730.

The Same anſwered by Mr. John Buddle.

THE Ball deſcends by a compound Force (of Gravity and the Ship's Motion forward in the Curve of a common *Parabola*, whoſe Equation is $ax=yy$.

There is given the *Abſciſſa* $x=432{,}25$ Inches, deſcended by the *Force* of Gravity only; and its correſponding Semiordinate = 25 *Grecian* Feet = 302,1 Engliſh Inches; and $a=210.1656$ the *Parameter* of the *Parabola*.

By the *Curve*'s Equation, $\dot{x}=\frac{2y\dot{y}}{a}$, whence the *Fluxion* of the Curve's Length $\sqrt{\dot{x}\dot{x}+\dot{y}\dot{y}}$ is $\frac{\dot{y}}{a}\sqrt{aa+yy}$, whoſe *Fluent* corrected by *Forms* 9 and 10 of *Emerſon*'s Fluxions, the Curve's Length will be $\frac{y}{a}\sqrt{\frac{1}{4}aa+yy};+\frac{2{,}30258a}{4}\times\text{Log.}\frac{y+\sqrt{\frac{1}{4}aa+yy}}{\frac{1}{2}a}=553{\cdot}31699$ *Inches*, the Space deſcribed by the *Ball*. Q. E. I.

ANSWER *to the* PRIZE-QUESTION *in the* PALLADIUM for 1759, *by* URANIA.

THE moſt eaſy and expeditious Method of giving the Times of the *Eclipſes* and other *Phænomena* required, is by determining them from *De la Caille*'s *Ephemeride* for *Paris*. Which uſeful Performance we are obliged to ſend for into *England*, becauſe (ſince our late famous Dr. *Halley*) the *Britiſh* aſtronomical Profeſſors ar not pleaſed to afford us a *Manufacture* ſo uſeful of our own.

IV. ECLIPSES, 1760: II. of the SUN and II. of the MOON.

I. Of the MOON, *May* 29, at Night.

At	Beginning.	Middle.	End.	Duration	Digits eclips'd.	
	h m s	h m s	h m s	m s		On the Southern Part.
Greenwich.	9 13 37	9 36 37	9 59 37	46 0	24′ of a [Dig.	
At *Gibraltar.*	8 53 45	9 16 45	9 39 45	Same.	Same.	

The Times, correſpondent to thoſe at *Greenwich*, in *Antigua*, *Jamaica*, *New England*, and *Virginia*, are 4 Hours or more ſooner; and conſequently this Eclipſ of the Moon, in thoſe Places, is *inviſible*; happening to thoſe Inhabitants in th Day-Time.

At *Bengal* this Eclipſe of the Moon happens $6^h\ 9^m$ later, and at *Bombay* $4^h\ 52^m$ later, than at *Greenwich*.

II. Of the SUN, *June* 13, Morning.

	Beginning.	Middle.	End.	Digits eclipſed.
	h m	h m	h m	d ′
At *Greenwich.*	6 41	7 14	8 17	4 10
At *Gibraltar*	6 50	. . . .		7 30

Being inviſible in *Antigua*, *Jamaica*, *New England*, and *Virginia*, where the Moon's *Penumbra* does not come.

The Moon's *Penumbra* firſt touches the Earth's Surface on the *African* Coaſt. It paſſes over the Regions of *Europe*, great Part of *Africa* and *Aſia*; and is bounded by the *Arctic* Circle and a Line from *Guinea* to the *Philippine* Iſlands. The *central* Eclipſe, or dark Shadow, enters at Sun-riſe near *Barbary*, and traverſes over the *Mediterranean*, *Perſia*, *India*, and *China*; at which laſt Coaſt at Sun-ſet it quits the Earth's Surface, and falls into the Expanſe.

III. Of the MOON, *November* 22, at Night.

At *Greenwich.*	Beginning.	Middle.	End.	Duration	Digits eclipſed.	On the North^{n}. Part.
	h m s	h m s	h m s	h m		
	7 55 16	9 8 46	10 22 16	2 27	6^{d} 21′	

Inviſible at the Places beforementioned, in *America*.

Viſible at *Gibraltar* 19^{m} 52^{s} ſooner; at *Bengal* 6^{h} 9^{m}, and at *Bombay* 4^{h} 52^{m} later than at *Greenwich*.

IV. Of the SUN, *December* 7th, 2^{h} 8^{m} Afternoon.

Inviſible at *Greenwich*, or in *Europe*, but *viſible* in South *America*, where the Moon's *Penumbra* paſſes over the Earth's Surface.

January 29, *Appulſe* ☽ and H ♊; The Moon's upper Limb 4′ from *, at 2^{h} 23^{m}, Morn. at *Greenwich*.

May 19, *Occultation* γ ♋ by the *Moon*.
Immerſion 7^{h} 28^{m} } Night at *Greenwich*.
Emerſion 8 33 } Moon's Center 4′ ſoutherly of *.

June 22, *Occultation* χ ♍ by the *Moon*.
Immerſion 11^{h} 15^{m} } Night, at *Greenwich*.
Emerſion 12 22 } Moon's Center 3′ northerly of *.

November 25, *Occultation* ε ♊ by the *Moon*.
Immerſion 6^{h} 2^{m} Morning } at *Greenwich*.
Emerſion 6 59 Morning } Moon's Center 6′ ſoutherly of *.

December 25, *Occultation* η ♌ by the *Moon*.
Immerſion 10^{h} 4^{m} } Night, at *Greenwich*.
Emerſion 10 37 } Moon's Center 14′ ſoutherly of *.

REMARK on ECLIPSES of the SUN.

THE Moon's greateſt apparent Diameter exceeds the leaſt Sun's apparent Diameter by about 2′ 4″; whence the *total Darkneſs*, in the greateſt Eclipſe of the Sun that can happen, continues while the Moon moves from the Sun, 2′ 4″ of a *Degree* in her Orbit; being about 4^{m} 5^{s} of *Time*.

The Moon's *dark Shadow* covers a Spot on the Earth's Surface about 3° 10′ or 190 geographical Miles broad, or 220 *Engliſh* Miles, when the Moon's apparent Diameter is *greateſt* and that of the Sun's the leaſt; and therefore the *total Darkneſs* of a ſolar Eclipſe extends no further to the Earth's Inhabitants than where the Moon's *dark Shadow* covers the *Track*. But the Moon's *partial* Shadow, or *Penumbra*, can, at the ſame Time, cover a *circular* Space of 70° 50′ or 4900 *Engliſh* Miles in Diameter, within which the Sun is ſeen more or leſs eclipſed, from Places more or leſs diſtant from the *Penumbra*'s Center.

When a new Moon, at a *ſolar* Eclipſe, happens in the *Node*, or Place of the Moon croſſing the Ecliptic, the Moon's *Penumbra*, at the Middle of the *general Eclipſe*, is circular; falling perpendicular on the Earth's Surface: But at every other Time of Duration, it falls *obliquely* on the Earth's Surface; and therefore its Figure thereon will be *elliptical*; and more or leſs ſo, as the Time is more or leſs from the Middle of the *general Eclipſe*, when the greater or leſs Surface of the Earth is covered.

The *general Eclipſe* begins when the Moon's *Penumbra* firſt touches the Earth's Surface, and ends when it quits the Surface. And from the Beginning to the End of the Moon's *Penumbra* travelling over the Earth's Surface, the Sun appears eclipſed to ſome of thoſe *Parts* which it travels over.

A *particular* Eclipſe of the Sun begins when the Moon's *Penumbra* firſt touches that Place, and continues till the *Penumbra* quits it.

When the *new Moon* happens in the *Ecliptic*, or *Node*, the Moon's *Penumbra* paſſes over the Center of the Earth's Diſk, as ſeen at the Moon; and, by deſcribing the *longeſt Track* poſſible upon the Earth, continues the *longeſt*, or at the mean Rate of 5 *Hours* and 50 *Minutes*; but *more*, if the Moon is at her greateſt Diſtance, then moving *ſloweſt*; or *leſs*, if ſhe is at the leaſt Diſtance, then moving *quickeſt*. — The Limits of a ſolar Eclipſe are when the Moon is about 16° 36′ from her *Node*, at new Moon; when the *Borders* of Sun and Moon are ſeen to *touch*: If the Moon is leſs diſtant than 16° 36′ from her ☊, an Eclipſe greater or leſs muſt happen; otherwiſe not.

The Motion of the *Shadow* from *Weſt* to *Eaſt*, on the Earth's Surface, is equal to the Motion of the *Moon* from the *Sun*; being at a mean Rate, ½ Degree every Hour.

And ½ *Degree* in the Moon's Orb is equal to 30 Degrees of the Earth's great Circle, and therefore the *Moon's Shadow* travels 30 *Degrees*, or 1800 *geographical* Miles over the Earth's Surface in an Hour, or 30 Miles in a Minute; being about four Times as ſwift as a Cannon Ball flies.

Of LUNAR ECLIPSES.

The Moon is ſometimes ſeen totally eclipſed in the Horizon, when the Sun ha been viſible at the ſame Time, in the oppoſite Part thereof, by *Refraction*. The longeſt Duration of a total and central lunar Eclipſe is about 3^h 57^m at her greateſ Diſtance from the Earth, and 3^h 37^m at her leaſt Diſtance.

As Rad. : Sine ☽'s Lat. :: Sine ∠ ☽'s Way with Circle Lat. : Sine neareſ Diſtance of the Moon's Shadow and her Center.

From Sum ☉ and ☽'s horizontal Parallax ſubtract the apparent Semi-Diamete ☉, the Remainder = apparent Semi-Diameter of the *Earth's Shadow*; which muſt be encreaſed by about 50″ for the Earth's Atmoſphere.

To the Semi-Diameter of the *Earth's Shadow* thus encreaſed add the apparen Semi-Diameter ☽, and if the *Sum* be greater than the *neareſt Diſtance* of their Centers (before found) the Moon muſt be eclipſed at that Time, otherwiſe not. —

If found eclipſed, from the Sum of the Semi-Diameters of the Moon an Earth's Shadow, ſubtract the neareſt Approach of their Centers, and the *Remainder* will be the deficient Part.

Say, As Semi-Diam. ☽ : 6 Digits or 360′ :: Part deficient : Digits eclipſe of the Moon. — The Moon's *Eclipſe-Limits* are about 12° 5′, her Diſtance fro the Node, at full Moon; if leſs, ſhe muſt be partly or wholly involved in the Earth' Shadow and *Penumbra*.

The USE of a terreſtrial GLOBE in ſhewing ECLIPSES of the SUN and MOON.

FIND the *Place* on a Globe to which the Sun is *vertical* in the Middle of a *ſolar* or *lunar* Eclipſe, which being elevated to the Latitude of that Place, then in moſt of the Places above the Horizon the *Sun* will be ſeen eclipſed. And in all Places below the Horizon, the Moon will be ſeen to paſs through the *Earth's Shadow* in her Eclipſe.

URANIA claims the *Prize-Palladiums* without a Competitor.

ANSWERS *to the* PARADOXES *in the* PALLADIUM *for* 1759.

I. PARADOX *anſwered by* NUMERICUS.

THUS nine *like Figures** plac'd to *View*,
The *greateſt Quantity* will ſhew.
If, otherwiſe, the *leaſt* you chuſe,
Inſtead of that, this *Method* † uſe.

*$9^{99999999}$ *Power.* † $\frac{\overline{9}}{99}\big|999999$ *Power.*

☞ The *Maximum* and *Minimum* are beſt diſcovered by determining the greateſt and leaſt Logarithms to both Quantities.

II. PARADOX *anſwered by Mr.* Huntley.

SIX Figures thus diſpos'd ‖ expreſs
Ten Thouſand — neither more nor leſs.

‖ $9999\frac{9}{9}$

Mr. *Robert Abbey* of *Watford*, *Northamptonſhire*, anſwered it in the ſame Manner; ſo did Mr. *Hammond*, the Propoſer; Mr. *George Stapley*, *&c.*

An Anſwer to the VOTER's QUESTION. *By Mr.* Stapley.

LET A and B repreſent the two firſt Candidates, and C the third, who has 34 Votes; then $52 - 34 = 18$, the Number of Votes that A and B have each at firſt voting. Again $18 + \frac{34}{2} = 35 =$ A's Number of Votes. Alſo $18 + \frac{34}{2} = 35 =$ B's Number of Votes; therefore C muſt loſe his *Election.*

Mr. *Ch. Maſon* ſends us an Anſwer to the 8th *Quere* in *Palladium* 1758, as follows, but came too late laſt Year to be inſerted.

THE Velocity of Tides gradually decreaſe, as the Diſtance increaſes from the Ocean; and *Obſtacles* alſo are to be conſidered, and the Quantity of Water as the Square of the Depth.

Suppoſe $a = 120$ Feet, $e = 13$, and $u = 40$: Then $a : e^2 :: u : \frac{e^2 u}{a} = 7,5055$, *&c.* Again, as 11 ($\frac{1}{3}$ of Miles) : 13 Depth :: 1 : 1,1818, *&c.* which added to the former gives the Height it will flow in the ſame Time and Diſtance, about $8\frac{2}{3}$ Feet.

Mr. George Stapley anſwered the ſame in the ſame Manner.

A

A TRUE CHARACTER. By the AUTHOR.

Mrs. ELIZABETH BEIGHTON, (*Relict* of the late Mr. Henry Beighton, F.R.S.) at *Chelvers-Coton.* near Sir Roger Newdigate's, *Bart.* of *Arbury*, *Warwickſhire*, Died, on *Friday*, the 12th of *October*, 1759: Much *regretted*, by All who had the Satisfaction to know her, for her many *excellent* and *admired Qualities.*

She was a public *Example* of diſintereſted *Friendſhip* and *Benevolence!* And her *Charity* and *good Offices*, to the utmoſt of her Abilities, were exceeded by none.

As ſhe delighted in the Promotion of *human Happineſs*, ſhe was a profeſſed Enemy to *Vice* and *Folly* in any Shape. And choſe her Acquaintance rather among the *Innocent* than the Great.

She was a great Encourager of *virtuous* Principles and Actions.

She admoniſhed the *Vicious* in the *Socratic* Way, and by laying the *Diſadvantages* of *Vice* before them in *general* Characters.

She encouraged the *Virtuous*, by ſhewing them the noble Characters of the *Wiſe*, *Great*, and *Happy* Men, in all Ages!

She was *eminent* for her exemplary *Conduct*, *Prudence*, *Piety*, and *Morals!* And her *Fidelity* was *ſacred* and *inviolable!*

She poſſeſſed the Talent of *ſprightly Wit* in an eminent Degree; which never failed to diſcover itſelf in her utmoſt *Afflictions*, *Diſtreſſes*, or *Misfortunes*, wherein her *Fortitude* of Mind was always remarkable. And, till the laſt alarming Circumſtance of her threatening *Diſorder*, (for 3 or 4 Years paſt) when her *Pain* was ſometimes *intolerable*, the *Gaity* of her Fancy was never known to flag.

It was by her *ſprightly* Talents and ſolid *Judgment*, that the Ladies Diary (of which ſhe was *Proprietor)* once flouriſhed with *unrivaled* Reputation! When, with the Aſſiſtance of her *Friends*, that *annual Work* was cultivated the *moſt* for public Utility, and the Advantage of that Society, enjoying the *Fruits* thereof; who continued her (as *Proprietor)* in the Right of her *Copy-Money*, ſince the *Diary* was performed by others.

She was *Miſtreſs* of an excellent *Memory* and *Underſtanding*; and knew the Choice of *Books*, as well as of *Company*; from whence, by her *ſelect* Reading and Converſation, ſhe derived *private* and *public* Advantages; to which her *ingenious*, *acute*, and *florid* Pen, did not a little contribute. *Two large Manuſcript Volumes of her literary Correſpondence, (treaſured by the Author of the* Palladium) *are everlaſting Monuments of her* Merit *and* Virtue!

She was a *conſtant* and *affectionate* Wife, a *kind* and *inſtructive* Parent, a *choice* and *ſincere* Friend, and a Noble Pattern of her Sex.

If any of the *Virtuous* upon Earth are bleſſed with a Perfection of Joy in a *State* of Life hereafter, her *Title* to *eternal* Happineſs is certainly the moſt *undoubted.*

Who, now, in the *Preſence* of the SUPREME BEING, attended with the *Angelic* and *Seraphic Hoſts* of Heaven, is poſſeſſed of Beatitude, paſt Utterance, Forevermore!

REMARKS *on the* late METHOD *of* OBSERVING *the* ECLIPSES of JUPITER's SATELLITES, *and* LONGITUDE at Sea, *by Mr.* IRWIN.

WE have ſeen it publiſhed in the *Papers*, that Mr. *Irwin*, from *Ireland*, pretends to have diſcovered the *Longitude* at *Sea*, to about 15 Miles or leſs, by obſerving the Times of the Eclipſes of *Jupiter*'s Satellites: The Right Honourable Lord Howe having atteſted that the Obſervations of theſe Eclipſes may be made within

3 Minutes of Time, which at 360° to 24 Hours, or 15 Miles to a Minute of Time, make 45 Miles, according to Lord *Howe*; inſtead of 15 Miles, according to Mr. *Irwin*. And as moſt of the *Theories* of theſe *Satellites* differ ſometimes about 3 or 4 Minutes, in the Time of theſe *Eclipſes* happening, at a firſt Meridian, by Computation, therefore when the Error of 4 Minutes, by Computation, lies the ſame Way with the Error of 3 Minutes of Time by Obſervation of thoſe Eclipſes under a diſtant Meridian, the *whole Error* of Time will be 7 *Minutes*. And 7 Times 15 make 105 Miles or 1° and ¾ Error of Longitude, by *Irwin*'s Method, a Quantity ſufficient to loſe a Ship; and therefore till the *Satellite-Theory* is perfected, this Method of obſerving the Longitude at Sea, by Mr. *Irwin*, cannot be depended on for Truth. But to render it as uſeful as poſſible, we have inſerted the Times of the *Eclipſes of Jupiter*'s firſt Satellite at *Greenwich*, in a following Table, from a new *Satellite-Theory* agreeing with Obſervation, the neareſt of any yet known. Mr. *Irwin*'s Diſcovery is the Method of obſerving the Eclipſes of *Jupiter*'s Satellite in a Chair, ſuſpended perpendicularly, in a Ship, at Sea; and is not the Diſcovery of the *Longitude itſelf* by that Obſervation.

Of OBSERVING the LONGITUDE at Sea, by the MOON's THEORY.

THE Moon's Theory being *more perfected* than that of the Satellites of *Jupiter*, if you take the Altitudes and Poſition of the Moon and ſome *fixed Star*, near to each other, and the Time of Obſervation, determining from thence the Moon's *true* from her apparent Place, under any diſtant Meridian, and find the *exact* Time, from Tables conſtructed from a correct lunar Theory, when the Moon's true Place at *Greenwich*, is the ſame with that obſerved under a diſtant Meridian; the Difference of which Times turned into Degrees, allowing 15 Miles to a Minute of Time, will be the *Difference* of Longitude between *Greenwich* and the *Place of Obſervation*. This Method we have exemplified in our *Aſtronomia Accurata*, or *Royal Aſtronomer and Navigator*. — For 13° 10′ 15″ ☽'s M. Mot. in 24 Hours, allow one 360th Part of it, or 2′ 11″, for every Deg. of Longitude being ☽'s Increaſe of Place in every 4 Minutes of Time. Hence, if the Moon's Theory errs 1 Minute of a Deg. it will give the Longitude of the Place of Obſervation within ½ Deg. of Truth, which is of great Uſe in *long Voyages*, and may give it nearer ſometimes. But if it errs 2′ 11″, the whole Dif. of ☽'s Place in 4 Minutes of Time, the Error of Long. obſerved, will be but 1 Degree, at any Time, which is leſs than 1¾ Deg. that may happen by *Jupiter's Satellite Theory*; except by the Times of thoſe Eclipſes from the laſt Improvement of it; we have given P. 73. to be depended on (where an Obſervation of the Time of an Eclipſe of 1ſt Satellite can be truly made) the moſt of any Method of obſerving the Longitude hitherto known. — The 360 Part of 50 Min. Dif. of Time in ☽'s Southing in 24 Hours affords not above 9 Seconds of Time for 1 Deg. Dif. Long. — But the 360 Part of 24 Hours Dif. Time of an Eclipſe of *Jupiter*'s 1ſt Sat. affords 4 Minutes Dif. *in Time to 1 Deg. Dif. of Long. obſerved.* Therefore, *happy* for Navigators, *when the Satellite* Theory *and Method of obſerving the exact Time of the Satellite* Eclipſes *are perfectly diſcovered!* — But our *aſtronomical* Obſervators (contrary to the Cuſtom of other Nations) deny us their Obſervations for improving into *uſeful Theories* for the public Utility, though they are paid with the public Money. — And we never could have obtained the radical *mean Places* and *Motions* of the Moon (denied us by Mr. *Gael Morris*, and others) but by bribing Mr. *Muckworm*, an Exchange-Broker, who helped us to our Wants: Who, with other Journey-Men Star-gazers, timely ſaved the Scaling and Storming of the Obſervatory, by their Friendſhip!

Mrs. *Beaumont* won the 4, Mr. *Isaac Tarrat* the 3, and Mr. *G. Stapley* the 2 Prize Ænigma *Palladiums*.

A TABLE for ſhewing the Difference of LONGITUDE from GREENWIC by OBSERVATION.

Correct Times of the ECLIPSES of the firſt SATELLITE of JUPITER, fi 1760, N. S. at *Greenwich* Obſervatory.

January.

Jupiter being in Conjunction with the Sun, in this Month, the *Eclipſes* of his 1ſt Satellite are inviſible till *February* 14.

February.				March.				April.				May.				June.		
Immer.				Immer.				Immer.				Immer.				Immer.		
D.	h	m	s	D.	h	m	s	D.	h	m	s	D.	h	m	s	D.	h	m
14	15	13	27	1	13	32	12	2	10	12	56	2	12	22	5	1	14*	23
16	9	44	5	3	8	1	3	4	4	41	51	4	6	50	39	3	8	51
18	4	10	46	5	2	29	55	5	23	10	45	6	1	19	11	5	3	19
19	22	39	28	6	20	58	48	7	17	39	39	7	19	47	40	6	21	47
21	17	8	12	8	15	27	42	9	12	8	33	9	14*	16	7	8	16	15
23	11	36	58	10	9	56	37	11	6	7	26	11	8	44	33	10	10	43
25	6	5	45	12	4	25	43	13	1	6	18	13	3	12	57	12	5	11
27	0	34	33	13	22	54	29	14	19	35	10	14	21	41	40	13	23	39
28	19*	3	22	15	17*	23	26	16	14	4	1	16	16*	9	42	15	18	7
				17	11	52	23	18	8	32	49	18	10	38	2	17	12*	35
				19	6	21	20	20	3	1	33	20	5	6	21	19	7	3
				21	0	50	17	21	21	30	15	21	23	34	38	21	1	32
				22	19	19	14	23	15*	58	56	23	18	2	51	22	20	0
				24	13	48	12	25	10	27	36	25	12	31	1	24	14*	28
				26	8	17	9	27	4	56	15	27	6	59	10	26	8	56
				28	2	46	7	28	23	24	53	29	1	27	17	28	3	24
				29	21	15	4	30	17	53	30	30	19	55	23	29	21	52
				31	15	44	0											

Computed by a *New Theory* agreeing with Obſervation. For the Uſe of the *Navigator.*

☞ Theſe Times to be compared with thoſe obſerv in Mr. *Irwin*'s Chair, at Sea!

July.				August.				September				October.				November				December		
Immer.				Immer.				Emerſions				Emerſions				Emerſions				Emerſion		
D.	h	m	s	D.	h	m	s	D.	h	m	s	D.	h	m	s	D.	h	m	s	D.	h	m
1	16	20	28	2	12	51	34	1	17	20	34	1	19	39	38	2	16	25	28	1	0	2
3	10*	48	36	4	7	20	16	3	11*	49	49	3	14	9	2	4	10	54	25	2	18	31
5	5	16	46	6	1	49	2	5	6*	19	5	5	8*	38	23	6	5*	23	17	4	12	59
6	23	44	58	7	20	17	52	7	0	48	22	7	3	7	43	7	23	52	5	6	7*	27
8	18	13	11	9	14*	46	47	8	19	17	40	8	21	37	2	9	18	20	50	8	1	55
10	12*	41	26	11	9*	15	42	10	13*	46	59	10	16	6	20	11	12	49	31	9	20	23
12	7	9	43	13	3	44	37	12	8*	16	19	12	10*	35	38	13	7*	18	9	11	14	51
14	1	38	1	Emerſions				14	2	45	39	14	5	4	56	15	1	46	45	13	9	20
15	20	6	21	15	0	29	35	15	21	14	59	15	23	34	13	16	20	15	19	15	4*	48
17	14*	34	44	16	18	57	42	17	15	44	20	17	18	3	29	18	14	43	51	16	22	16
19	9	3	9	18	13*	27	30	19	10*	13	42	19	12	32	44	20	9	12	22	18	16	44
21	3	31	36	20	7*	56	31	21	4	43	4	21	7*	1	57	22	3	40	51	20	11	12
22	22	0	5	22	2	25	35	22	23	12	26	23	1	31	7	23	22	9	19	22	5*	40
24	16	28	36	23	20	54	41	24	17	41	50	24	20	0	14	25	16	37	44	24	0	8
26	10*	57	9	25	15*	23	49	26	12*	11	16	26	14	29	19	27	11	6	7	25	18	36
28	5	25	43	27	9*	52	48	28	6*	40	43	28	8*	58	23	29	5*	34	28	27	13	4
29	23	53	18	29	4	22	9	30	1	10	11	30	3	27	26					29	7*	32
31	18	22	55	30	22	51	21					31	21	56	28					31	4	0

N. B. The *Aſteriſm* (*) is placed againſt thoſe Eclipſes of the 1ſt Satellite of *J*

Royal EPHEMERIS, for *Greenwich Obſervatory*, 1760.

D.	January.		February.		March.		April.		May.		June.	
	☽ South	Decl. Noon.	☽ South	Decl. at N.	☽ South	Decl. Noon	☽ South	Decl. Noon.	☽ South	Decl. Noon.	☽ South	Decl. Noon.
	h m	° ′	h m	° ′	h m	° ′	h m	° ′	h m	° ′	h m	° ′
1	11 17	23N 4	12 40	20N 0	12 11	13N 21	13 7	4S 54	13 22	16S 4	14 40	25S 2
2	12 18	24 11	13 28	16 21	12 56	8 43	13 49	9 44	14 9	20 28	15 33	24 33
3	13 17	23 41	14 14	11 52	13 39	3 45	14 33	14 7	14 58	23 0	16 24	22 50
4	14 11	21 49	14 58	7 5	14 21	1S 20	15 19	17 59	15 49	24 32	17 14	20 0
5	15 3	18 43	15 41	2 8	15 4	6 17	16 9	21 6	16 42	24 58	18 2	16 6
6	15 51	14 45	16 22	2S 54	15 47	10 57	16 59	23 21	17 33	24 13	18 49	11 26
7	16 35	10 15	17 6	7 41	16 31	15 8	17 51	24 36	18 25	22 9	19 36	6 3
8	17 16	5 26	17 50	12 12	17 17	18 48	18 43	24 41	19 15	19 1	20 23	0 16
9	17 57	0 29	18 36	16 13	18 6	21 40	19 35	23 30	20 4	14 47	21 14	5N 49
10	18 37	4S 24	19 24	19 38	18 57	23 36	20 27	21 5	20 52	9 47	22 8	11 40
11	19 19	9 6	20 15	22 14	19 51	24 31	21 19	17 31	21 42	3 38	23 8	16 57
12	20 1	13 19	21 6	23 52	20 45	24 11	22 11	12 52	22 34	2N 4	ó	21 11
13	20 47	17 19	21 59	24 20	21 40	22 32	23 3	7 23	23 30	8 15	0 11	23 59
14	21 36	20 30	22 54	23 30	22 33	19 36	23 56	1 23	ó	14 2	1 13	24 59
15	22 29	22 50	23 49	21 23	23 26	15 31	ó	4N 54	0 29	18 58	2 15	24 18
16	23 23	24 4	ó	17 58	ó	10 31	0 52	10 57	1 33	22 35	3 14	22 3
17	ó	24 7	0 41	13 31	0 17	4 44	1 48	16 20	2 38	24 38	4 8	18 11
18	0 18	22 50	1 32	8 14	1 9	1N 14	2 46	20 39	3 43	24 56	4 57	14 12
19	1 11	20 17	2 23	2 30	2 2	7 29	3 47	23 33	4 44	23 34	5 42	9 22
20	2 9	16 36	3 13	3N 27	2 56	11 4	4 47	24 49	5 40	20 53	6 24	4 17
21	2 52	12 2	4 4	9 13	3 52	17 58	5 48	24 30	6 29	17 12	7 6	0S 49
22	3 42	6 41	4 56	14 26	4 52	21 38	6 44	22 44	7 13	12 46	7 46	5 55
23	4 31	1 1	5 52	18 50	5 51	23 54	7 36	19 49	7 55	7 55	8 28	10 45
24	5 21	4N 45	6 48	22 8	6 50	24 40	8 24	15 36	8 35	2 53	9 11	15 1
25	6 9	10 19	7 45	23 58	7 46	23 58	9 7	11 27	9 14	2S 16	9 56	18 51
26	7 2	15 18	8 43	24 25	8 38	21 55	9 50	6 34	9 54	7 14	10 43	21 52
27	7 57	19 30	9 40	23 24	9 28	18 45	10 30	1 32	10 35	11 54	11 34	23 58
28	8 56	22 26	10 34	21 3	10 15	14 25	11 12	3S 34	11 20	16 6	12 25	24 58
29	9 55	24 4	11 24	17 38	11 0	10 8	11 54	8 29	12 7	19 43	13 18	24 46
30	10 53	24 7	☽ S.Diam. to hor Par. as 15′ to 55′ 30″.		11 44	5 13	12 38	13 2	12 56	22 32	14 8	23 21
31	11 48	22 45			12 26	0 8			13 48	24 20		

D.	☽ S.D in Deg	In T.	D.	☽ S.D	T.	D.	☽ S.D in Deg	In T.	D.	☽ S.D in Deg	In T.	D.	☽ S.D in Deg	In T.	D.	☽ S.D in Deg	In Time
	′ ″	s		′ ″	s		′ ″	s		′ ″	s		′ ″	s		′ ″	s
1	16 4	61	1	15 41	69	1	15 21	66	1	14 53	62	1	14 48	64	1	14 57	69
3	15 49	72	3	15 20	65	3	15 21	62	3	14 47	63	3	14 49	67	3	15 10	68
12	14 49	65	5	15 2	62	5	14 51	62	5	14 47	66	5	14 58	69	5	15 28	67
14	14 47	67	7	14 50	62	7	14 46	63	7	14 57	68	7	15 16	68	7	15 48	66
16	14 53	69	9	14 47	64	9	14 51	66	9	15 2[illegible]	69	9	15 42	67	9	16 20	68
18	15 12	68	11	15 1	67	11	15 7	69	11	15 47	69	18	16 16	75	17	15 47	69
20	15 40	67	13	16 20	70	20	16 25	70	19	16 20	74	20	15 44	70	19	15 17	64
2	16 12	67	20	16 14	67	22	16 9	73	21	15 54	73	22	15 15	65	21	14 55	61
4	16 32	70	22	16 9	70	24	15 48	72	23	15 27	68	24	14 58	62	23	14 47	62
6	16 35	74	24	15 58	72	26	15 32	69	25	15 4	63	26	14 50	62	25	14 46	65
8	16 20	75	26	15 51	73	28	15 15	65	27	14 56	62	28	14 48	64	27	14 53	68
0	15 45	67	28	15 25	69	30	15 2[illegible]	6[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Royal EPHEMERIS for *Greenwich-Observatory*, 1760.

D.	July.		August.		September.		October.		November.		December	
	☽ South	Decl. Noon	☽ South	Decl. Noon	☽ South	Decl. Noon.	☽ South	Decl. Noon.	☽ South	Decl. Noon.	☽ Sout	Dec Noo
	h m	° ′	h m	° ′	h m	° ′	h m	° ′	h m	° ′	h m	°
1	14 59	20S45	16 8	2S55	17 36	17n57	18 38	25n26	20 10	17n20	20 17	3N
2	15 47	17 6	16 56	2N56	18 34	21 43	19 33	25 10	20 55	12 37	20 59	1S
3	16 33	12 32	17 47	8 40	19 34	24 19	20 26	23 23	21 40	7 27	21 41	7
4	17 21	7 28	18 41	14 7	20 35	25 18	21 17	20 19	22 22	2 10	22 25	12
5	18 8	1 45	19 36	18 45	21 31	24 40	22 5	16 48	23 7	3S21	23 10	16
6	18 55	4N7	20 34	22 14	22 25	22 31	22 53	11 16	23 50	8 28	23 58	20
7	19 45	9 54	21 34	24 32	23 14	19 4	23 38	6 1	☌	13 19	☌	23
8	20 40	15 13	22 32	25 6	☌	14 40	☌	0 40	0 34	17 34	0 47	25
9	21 38	19 46	23 31	24 1	0 2	9 38	0 21	4S38	1 19	21 7	1 36	25
10	22 41	23 5	☌	21 25	0 49	4 18	1 4	9 55	2 7	23 45	2 25	25
11	23 46	24 50	0 26	17 36	1 34	1S 4	1 49	14 34	2 56	25 19	3 13	23
12	☌	24 50	1 18	12 56	2 20	6 26	2 36	18 38	3 47	25 47	4 3	20
13	0 48	23 9	2 7	8 47	3 4	11 23	3 22	21 52	4 37	25 2	4 51	17
14	1 49	20 1	2 52	2 25	3 48	15 48	4 10	24 13	5 26	23 6	5 36	12
15	2 42	15 52	3 35	2S56	4 34	19 36	5 1	25 36	6 14	20 3	6 21	7
16	3 30	11 4	4 17	8 2	5 21	22 31	5 52	25 33	7 2	15 54	7 5	1
17	4 15	5 54	5 0	12 47	6 11	24 30	6 43	24 26	7 49	11 12	7 53	4N
18	4 58	0 37	5 45	16 57	7 2	25 24	7 34	22 17	8 36	5 39	8 43	10
19	5 40	4N32	6 31	20 26	7 54	25 5	8 24	18 41	9 26	0N20	9 37	15
20	6 21	9 23	7 19	23 4	8 46	23 31	9 13	14 8	10 17	6 32	10 35	20
21	7 4	13 50	8 10	24 42	9 38	20 42	10 2	8 58	11 12	12 30	11 38	23
22	7 49	17 50	9 2	25 12	10 28	16 46	10 51	3 11	12 10	17 55	12 42	25
23	8 36	21 12	9 55	24 28	11 17	12 4	11 41	3N 6	13 8	22 12	13 48	25
24	9 25	23 33	10 48	22 28	12 6	6 29	12 34	9 18	14 13	24 54	14 48	23
25	10 16	24 51	11 39	19 16	12 55	0 30	13 31	15 3	15 16	25 48	15 42	19
26	11 8	25 0	12 30	15 12	13 49	5N43	14 31	19 56	16 16	24 50	16 33	15
27	12 0	23 51	13 19	9 59	14 43	11 38	15 33	23 28	17 12	22 19	17 18	10
28	12 52	21 30	14 9	4 20	15 40	16 54	16 37	25 23	18 4	18 33	18 1	5
29	13 42	18 3	14 58	1N31	15 39	21 8	17 37	25 37	18 51	13 56	18 44	0S
30	14 32	13 37	15 48	7 28	17 39	24 5	18 35	24 8	19 35	8 48	19 27	5
31	15 21	8 29	16 41	13 3			19 24	21 14			20 10	11

D.	☽ S.D in Deg	In T.	D.	☽ S.D in Deg	In T.	D	☽ S.D in Deg	In T.	D.	☽ S.D in Deg	In T.	D.	☽ S.D in Deg	In T.	D.	☽ S.D In Deg	In Tin
	′ ″	s		′ ″	s		′ ″	s		′ ″	s		′ ″	s		′ ″	s
1	15 17	68	1	15 49	66	1	16 7	71	1	16 4	74	1	15 34	67	1	15 12	6
3	15 32	66	3	15 59	67	3	16 5	74	3	15 49	72	3	15 23	64	3	14 58	6
5	15 50	66	5	16 9	71	5	15 59	73	12	14 49	65	11	14 48	68	12	15 0	6
7	16 9	68	7	16 14	74	13	14 58	63	14	14 47	67	13	14 52	68	14	15 15	6
16	15 33	65	16	15 0	60	15	14 48	65	16	14 53	69	15	15 8	67	16	15 46	6
18	15 8	62	18	14 48	64	17	14 50	68	18	15 12	68	17	15 36	66	18	16 15	6
20	14 51	62	20	14 50	67	19	15 3	69	20	15 40	67	19	16 7	67	20	16 40	7
22	14 46	64	22	15 2	69	21	15 26	69	22	16 12	67	21	16 37	71	22	16 44	7
24	14 51	67	24	15 22	69	23	15 33	67	24	16 32	70	23	16 45	76	24	16 27	7
26	15 9	70	26	15 41	67	25	16 13	67	26	16 35	74	25	16 32	76	26	15 55	6
28	15 22	69	28	16 0	66	27	16 23	70	28	16 20	75	27	16 5	72	28	15 24	6

Royal EPHEMERIS, for GREENWICH-OBSERVATORY, 1760.

JANUARY.

	♄		♃		♂		♀		☿	
D.	South	Dec	South	Dec.	South	Dec.	South	Dec.	South	Dec.
	h m	° '	h m	° '	h m	° '	h m	° '	h m	° '
1	4 8	9S 3	1 20	20S50	16 51	5N16	20 44	19S20	0 24	20S24
4	3 56	8 57	1 10	20 41	16 40	5 0	20 42	16 1	☌	19 52
7	3 44	8 51	1 0	20 32	16 29	4 45	20 41	16 41	23 46	19 54
10	3 32	8 44	0 50	20 22	16 18	4 35	20 40	17 20	22 51	20 3
13	3 20	8 38	0 40	20 13	16 7	4 27	20 40	17 58	22 36	20 10
16	3 8	8 32	0 30	20 4	15 56	4 19	20 40	18 35	22 26	20 44
19	2 57	8 25	0 20	19 54	15 44	4 14	20 41	19 10	22 19	21 7
22	2 45	8 18	0 11	19 44	15 32	4 12	20 42	19 38	22 15	21 34
25	2 34	8 11	0 1	19 34	15 20	4 14	20 43	20 3	22 14	21 52
28	2 23	8 3	23 48	19 23	15 8	4 17	20 44	20 26	22 15	22 7
D.	FEBRUARY.									
1	2 7	7S52	23 35	19S10	14 52	4N22	20 49	20S50	22 20	22S12
4	1 56	7 44	23 25	19 0	14 40	4 34	20 51	21 4	22 24	22 3
7	1 45	7 36	23 16	18 49	14 27	4 47	20 53	21 14	22 29	21 46
10	1 34	7 28	23 7	18 38	14 15	4 58	20 56	21 14	22 36	21 56
13	1 24	7 20	22 58	18 28	14 2	5 12	20 59	21 12	22 43	20 20
16	1 14	7 12	22 49	18 17	13 48	5 30	21 2	21 5	22 50	19 44
19	1 4	7 3	22 41	18 6	13 34	5 51	21 6	20 54	22 57	18 39
22	0 54	6 55	22 32	17 55	13 19	6 14	21 9	20 36	23 5	17 23
25	0 44	6 46	22 23	17 45	13 5	6 38	21 13	20 12	23 13	15 55
28	0 34	6 37	22 15	17 34	12 50	7 3	21 17	19 43	23 22	14 13
D.	MARCH.									
1	0 27	6S31	22 10	17S27	12 39	7N20	21 18	19S24	23 28	13 S 0
4	0 17	6 23	22 1	17 16	12 24	7 47	21 21	18 49	23 37	10 58
7	0 7	6 14	21 53	17 4	12 8	8 12	21 25	18 5	23 46	8 44
10	23 54	6 6	21 44	16 52	11 53	8 35	21 29	17 20	23 56	6 18
13	23 44	5 57	21 36	16 41	11 37	8 59	21 32	16 31	0 3	3 48
16	23 34	5 48	21 28	16 30	11 22	9 24	21 36	15 37	0 14	1 0
19	23 24	5 40	21 20	16 19	11 8	9 46	21 39	14 40	0 24	1N47
22	23 13	5 31	21 12	16 9	10 53	10 4	21 43	13 37	0 34	4 39
25	23 3	5 23	21 4	15 58	10 29	10 20	21 47	12 32	0 43	7 28
28	22 52	5 15	20 55	15 48	10 24	10 34	21 51	11 22	0 53	10 5
D.	APRIL.									
1	22 44	5 S 4	20 42	15S34	10 5	10N46	21 53	9S47	1 4	13N13
4	22 35	4 56	20 33	15 24	9 51	10 56	21 55	8 31	1 7	15 9
7	22 26	4 48	20 24	15 14	9 38	10 59	21 59	7 16	1 10	16 35
10	22 16	4 40	20 15	15 5	9 25	10 57	22 1	5 59	1 8	17 34
13	22 6	4 32	20 6	14 56	9 13	10 55	22 4	4 38	1 2	18 4
16	21 56	4 24	19 57	14 47	9 1	10 52	22 6	3 15	0 53	18 7
19	21 46	4 17	19 48	14 38	8 50	10 46	22 8	1 52	0 42	17 41
22	21 36	4 10	19 38	14 30	8 39	10 37	22 10	0 29	0 27	16 51
25	21 26	4 3	19 29	14 22	8 28	10 27	22 12	0N56	0 10	15 40
28	21 15	3 56	19 19	14 14	8 18	19 12	22 14	2 30	23 46	14 15

☞ The Declinations are for the Noon of each Day.

Royal EPHEMERIS for GREENWICH-OBSERVATORY, 1760.

MAY.

	♄				♃				♂				♀				☿			
D.	South		Dec.		South		Dec.		South		Dec.		South		Dec.		South		Dec.	
	h	m	°	′	h	m	°	′	h	m	°	′	h	m	°	′	h	m	°	′
1	21	5	3 S	49	19	9	14 S	7	8	9	9 N	58	22	16	3 N	44	23	29	12 N	48
4	20	55	3	43	18	59	14	0	7	59	9	40	22	18	5	7	23	13	11	31
7	20	45	3	37	18	49	13	53	7	50	9	20	22	19	6	30	22	59	10	30
10	20	34	3	31	18	39	13	46	7	40	8	59	22	21	7	51	22	48	9	49
13	20	24	3	26	18	28	13	40	7	31	8	36	22	23	9	11	22	39	9	28
16	20	13	3	21	18	18	13	35	7	22	8	12	22	25	10	31	22	23	9	27
19	20	2	3	16	18	7	13	31	7	13	7	47	22	27	11	49	22	28	9	51
22	19	51	3	11	17	56	13	27	7	5	7	19	22	30	13	3	22	25	10	31
25	11	39	3	6	17	46	13	24	6	56	6	51	22	32	14	13	22	24	11	30
28	19	28	3	2	17	35	13	22	6	48	6	21	22	34	15	40	22	24	12	38
D.	JUNE.																			
1	19	12	2 S	57	17	17	13 S	19	6	37	5	42	22	39	16 N	50	22	25	14 N	25
4	19	1	2	53	17	6	13	17	6	29	5	10	22	41	17	50	22	31	15	57
7	18	49	2	50	16	53	13	16	6	21	4	38	22	43	18	46	22	38	17	35
10	18	37	2	47	16	41	13	14	6	13	4	4	22	46	19	41	22	46	18	56
13	18	25	2	45	16	28	13	14	6	5	3	27	22	48	20	27	22	57	20	37
16	18	13	2	43	16	16	13	15	5	58	2	50	22	51	21	10	23	11	22	0
19	18	1	2	41	16	3	13	16	5	50	2	11	22	54	21	47	23	27	23	13
22	17	49	2	40	15	51	13	18	5	43	1	35	22	57	22	19	23	45	24	5
25	17	37	2	39	15	38	13	21	5	36	0	56	23	0	22	45	☌		24	34
28	17	25	2	38	15	26	13	24	5	29	0	19	23	3	23	7	0	14	24	36
D.	JULY.																			
1	17	12	2 S	37	15	13	13 S	27	5	22	0 S	22	23	7	23 N	20	0	26	24 N	12
4	17	0	2	37	15	0	13	31	5	15	1	2	23	10	23	29	0	41	23	18
7	16	48	2	38	14	47	13	36	5	8	1	43	23	14	23	32	0	55	22	26
10	16	35	2	38	14	33	13	41	5	2	2	24	23	18	23	28	1	7	21	7
13	16	23	2	39	14	20	13	47	4	55	3	6	23	21	23	17	1	16	19	35
16	16	10	2	41	14	7	13	53	4	49	3	50	23	26	23	0	1	24	17	54
19	15	58	2	43	13	54	13	59	4	43	4	34	23	30	22	37	1	31	16	9
22	15	46	2	45	13	41	14	5	4	37	5	17	23	34	22	8	1	36	14	14
25	15	34	2	47	13	28	14	12	4	32	6	0	23	38	21	33	1	40	12	27
28	15	22	2	50	13	15	14	40	4	26	6	43	23	42	20	54	1	43	10	37
D.	AUGUST.																			
1	15	6	2 S	54	12	57	14 S	31	4	20	7 S	39	23	47	19 N	51	1	45	8 N	15
4	14	54	2	57	12	44	14	39	4	15	8	22	23	50	18	59	1	45	6	34
7	14	42	3	1	12	32	14	47	4	10	9	5	23	54	18	4	1	43	5	0
10	14	30	3	5	12	20	14	55	4	6	9	48	23	58	17	1	1	38	3	34
13	14	18	3	9	12	6	15	3	4	2	10	33	☌		15	54	1	32	2	24
16	14	7	3	14	11	53	15	11	3	58	11	17	0	3	14	44	1	26	1	31
19	13	55	3	19	11	40	15	19	3	54	12	1	0	7	13	28	1	17	0	57
22	13	43	3	23	11	28	15	27	3	50	12	44	0	10	12	13	1	2	0	48
25	13	31	3	28	11	26	15	35	3	46	13	25	0	13	10	52	0	47	1	11

Royal EPHEMERIS for GREENWICH-OBSERVATORY, 1760.

	♄		♃		♂		♀		☿	
.	South	Dec.	South	Dec.	South	Dec.	South	Dec.	South	Dec.
	h m	° ′	h m	° ′	h m	° ′	h m	° ′	h m	° ′
	S E P T E M B E R.									
1	13 4	3 S 40	10 46	15 S 50	3 38	14 S 59	0 20	7 N 36	6	4 N 5
4	12 52	3 45	10 34	15 57	3 35	15 38	0 23	6 8	23 32	5 44
7	12 41	3 51	10 22	16 3	3 32	16 17	0 26	4 40	23 16	7 23
0	12 29	3 57	10 10	16 9	3 29	16 56	0 29	3 9	23 4	8 42
3	12 17	4 3	9 59	16 14	3 26	17 33	0 31	1 36	22 57	9 29
6	12 6	4 9	9 47	16 19	3 24	18 11	0 34	0 6	22 56	9 38
9	11 54	4 15	9 35	16 24	3 21	18 45	0 37	1 S 27	22 58	9 7
2	11 43	4 21	9 24	16 28	3 19	19 20	0 40	3 0	23 3	8 2
5	11 32	4 27	9 13	16 31	3 16	19 52	0 43	4 30	23 9	6 29
8	11 20	4 32	9 1	16 34	3 14	20 24	0 46	6 1	23 17	4 35
.	**O C T O B E R.**									
1	11 8	4 S 37	8 40	16 S 37	3 12	20 S 55	0 49	7 S 34	23 26	2 N 30
4	10 57	4 42	8 38	16 38	3 10	21 23	0 52	9 1	23 34	0 20
7	10 45	4 47	8 27	16 39	3 9	21 50	0 55	10 29	23 43	2 S 0
0	10 33	4 51	8 15	16 40	3 7	22 15	0 58	11 52	23 51	4 17
3	10 21	4 56	8 4	16 40	3 6	22 48	1 1	13 14	23 59	6 30
6	10 9	5 0	7 53	16 39	3 4	23 0	1 4	14 33	0 3	8 44
9	9 57	5 4	7 42	16 38	3 2	23 21	1 8	15 48	0 11	10 50
2	9 45	5 8	7 31	16 36	3 0	23 39	1 11	17 0	0 18	12 48
5	9 33	5 12	7 20	16 33	2 58	23 54	1 15	18 8	0 24	14 43
8	9 21	5 15	7 9	16 30	2 56	24 8	1 18	19 13	0 29	16 30
D.	**N O V E M B E R.**									
1	9 4	5 S 19	6 55	16 S 26	2 54	24 S 22	1 22	20 S 32	0 43	18 S 41
4	8 52	5 21	6 44	16 22	2 52	24 30	1 25	21 25	0 49	20 7
7	8 40	5 22	6 33	16 17	2 50	24 35	1 29	22 12	0 54	21 31
10	8 28	5 23	6 22	16 11	2 47	24 39	1 33	22 54	1 0	22 41
13	8 16	5 24	6 11	16 5	2 45	24 40	1 36	23 28	1 6	23 42
16	8 4	5 25	6 0	15 59	2 43	24 S 38	1 40	23 58	1 12	24 30
19	7 51	5 25	5 49	15 52	2 41	24 35	1 43	24 21	1 18	25 9
22	7 39	5 25	5 38	15 45	2 39	24 28	1 47	24 38	1 23	25 34
25	7 26	5 24	5 27	15 37	2 36	24 20	1 51	24 48	1 28	25 48
28	7 13	5 23	5 16	15 29	2 33	24 14	1 54	24 50	1 31	25 47
D.	**D E C E M B E R.**									
1	7 0	5 S 22	5 3	15 S 21	2 30	23 S 56	1 58	24 S 46	1 31	25 S 35
4	6 47	5 20	4 52	15 12	2 27	23 40	2 1	24 34	1 27	25 9
7	6 34	5 18	4 41	15 2	2 24	23 20	2 4	24 17	1 21	24 33
10	6 21	5 15	4 29	14 52	2 21	22 59	2 7	23 52	1 9	23 54
13	6 8	5 12	4 18	14 42	2 18	22 35	2 10	23 22	0 47	22 56
16	5 55	5 9	4 6	14 31	2 14	22 10	2 13	22 45	0 19	21 58
19	5 42	5 5	3 55	14 21	2 11	21 42	2 15	22 1	23 39	21 0
22	5 29	5 1	3 43	14 10	2 7	21 11	2 18	21 13	23 12	20 22
25	5 16	4 57	3 32	13 58	2 4	20 40	2 20	20 18	22 52	20 2
28	5 3	4 53	3 21	13 45	2 0	20 5	2 22	19 19	22 35	20 1

N. B. *We had not Room for the* cœleſtial *Phænomena and Obſervations*, 1760.

A New Table of the *Radical* Mean *Places* and *Motions* of the Moon from the Sun conſtructed from the *Aſtronomia Arcana*. For *Greenwich-Obſervatory*.

Julian or old Style.

Yrs of Chr.	M. Plac. ☽ fr. ☉
Bef. Chr. 1	2ˢ 13° 43′ 38″
S. Chr. 1600	10 7 51 0
1700	8 14 58 58
1740	5 11 50 9

Gregorian or new Style.

B. 1600	6ˢ 5° 56′ 33″
C. 1700	4 0 53 4
B. 1760	5 11 9 51
C. 1800	1 25 49 35

Julian Yrs.	M. Mot. ☽ fr. ☉
20	4 13 25 36
40	8 26 51 11
60	1 10 16 47
80	5 23 42 23
100	10 7 7 58
200	8 14 15 56
300	6 21 23 54
400	4 28 31 52
500	3 5 39 50
600	1 12 47 48
700	11 19 55 46
800	9 27 3 44
900	8 4 11 42
1000	6 11 19 40
2000	0 22 39 20
3000	7 3 59 0
4000	1 15 18 40
5000	7 26 38 20
6000	2 7 58 0

In Lp. Yr. take out for a Day

Jul. Yrs.	M. Mot. ☽ fr. ☉
1	4ˢ 9° 37′ 25″
2	8 19 14 51
3	0 28 52 15
4	5 20 41 7
5	10 0 18 32
6	2 9 55 58
7	6 19 33 22
8	11 11 22 14
9	3 20 59 39
10	8 0 37 5
11	0 10 14 29
12	5 2 3 21
13	9 11 40 46
14	1 21 18 12
15	6 0 55 36
16	10 22 44 28
17	3 2 21 53
18	7 11 59 19
19	11 21 36 43

Months.	M. Mot. ☽ fr. ☉
Jan.	0ˢ 0° 0′ 0″
Feb.	0 17 54 48
March	11 29 15 16
April	0 17 10 3
May	0 22 53 23
June	1 10 48 11
July	1 16 31 32
Auguſt	2 4 26 20
Sept.	2 22 21 8
Oct.	2 28 4 29
Nov.	3 15 59 17
Dec.	3 21 42 37

Days.	M. Mot. ☽ fr. ☉
1	0ˢ 12° 11′ 27
2	0 24 22 53
3	1 6 34 20
4	1 18 45 47
5	2 0 57 13
6	2 13 8 40
7	2 25 20 7
8	3 7 31 24
9	3 19 43 0
10	4 1 54 27
11	4 14 5 54
12	4 26 17 20
13	5 8 28 47
14	5 20 40 14
15	6 2 51 40
16	6 15 3 7
17	6 27 14 34
18	7 9 26 0
19	7 21 37 27
20	8 3 48 54
21	8 16 0 21
22	8 28 11 47
23	9 10 23 14
24	9 22 34 41
25	10 4 46 7
26	10 16 57 34
27	10 29 9 1
28	11 11 20 7
29	11 23 31 54
30	0 5 43 21
31	0 17 54 48

leſs in *Jan.* and *Feb.*

H. M. S.	Mo. ☽ fr ☉ ° ′ ″ / ′ ″ ‴ / ″ ‴ iv	H. M. S.	Mo. ☽ fr ☉ ° ′ ″ / ′ ″ ‴ / ″ ‴ iv	H. M. S.	Mo. ☽ fr ☉ ° ′ ″ / ′ ″ ‴ / ″ ‴ iv	H. M. S.	Mo. ☽ fr ☉ ° ′ ″ / ′ ″ ‴ / ″ ‴ iv	H M. S.	Mo. ☽ fr ☉ ° ′ ″ / ′ ″ ‴ / ″ ‴ iv
1	0 30 29	13	6 36 12	25	12 41 55	37	0 18 48	49	0 24 5
2	1 0 57	14	7 6 41	26	13 12 24	38	0 19 18	50	0 25 2
3	1 31 26	15	7 37 9	27	13 42 53	39	0 19 49	51	0 25 5
4	2 1 54	16	8 7 38	28	14 13 21	40	0 20 19	52	0 26 2
5	2 32 23	17	8 38 6	29	14 43 50	41	0 20 50	53	0 26 5
6	3 2 52	18	9 8 35	30	15 14 18	42	0 21 20	54	0 27 2
7	3 33 20	19	9 39 4	31	0 15 45	43	0 21 50	55	0 27 5
8	4 3 49	20	10 9 32	32	0 16 15	44	0 22 21	56	0 28 2
9	4 34 17	21	10 40 1	33	0 16 46	45	0 22 51	57	0 28 5
10	5 4 46	22	11 10 29	34	0 17 16	46	0 23 22	58	0 29 2
11	5 35 15	23	11 40 58	35	0 17 47	47	0 23 52	59	0 29 5
12	6 5 43	24	12 11 27	36	0 18 17	48	0 24 23	60	0 30 2

EMENDATION of the PALLADIUM for 1759.

Page 74. For *March* 9, $1^s\ 29^\circ\ 9'\ 11''$ read $1^s\ 28^\circ\ 9'\ 11''$, an important Corection.

We are ſorry to object to the *abſurd* and *obſcure Anſwer* to the X. *inconſiſtent Queſ.* 40, at P. 64. by Mr. *Rubes*, or *Rebus*. Which Queſtion, when *conſiſtently* ſtated, beſt and readieſt reſolved by the Method of *Trial and Error*, as we have ſhewn at . 305, of our *Royal Aſtronomer and Navigator*. — The new *Navigation Queſtion* had een conſiſtently propoſed thus.

A Ship ſailed from the Lizard, *Lat.* 49° 55′ N. *on a conſtant but unknown Courſe, etween the South and Weſt,* 3429,38 *Miles or Minutes of a Degree, till ſhe found her ifference of Longitude to be* 53°: *Required her Courſe, and the Latitude arrived in?*

☞ Our *Aſtronomia Accurata* or *Royal Aſtronomer and Navigator* is printed as far as . 360, to the 45th Sheet, in Quarto, and only wait for the *Moon*'s new improved heory and *Precepts*, when it will be *delivered to the Subſcribers and then publiſhed.* t compriſes the Buſineſs of three Subjects, *viz.* *Practical Aſtronomy, Chronology,* nd *Navigation*; and will be ſold for more than the Price ſubſcribed for, becauſe f its Plan being augmented. — We doubt not its giving Satisfaction for its *Uſeful-eſs*, and therefore we are under no frightful Apprehenſions for what the Critics hall be pleaſed to ſay of it. In it we have amply repaired the Loſs of, if not excelled e long ago promiſed *Uranographia Brittanica*, by a correct Catalogue of Stars, with heir *Declinations, Right Aſcenſions*, and their annual *Variations*, given, to ſhew that here are Honour and *moral* Honeſty, yet among Authors, to Subſcribers.

N. B. Thoſe who are pleaſed to be Subſcribers to the Work muſt ſubſcribe forthith or the Subſcription will be cloſed. The Names of the laſt Subſcribers are as ollow,

Rev. Dr. *Bolton*, of *Stalbridge, Dorſet*,	3	Books.
Mr. *Bevil*, Maſter of *Harpſwell-School, Lincolnſhire*	1	
Rev. Mr. Archdeacon *Baſſet*	1	
Mr. *James Carter*, near *Oxford*	1	
Mr. *Stephen Fytche, Gainſborough, Lincoln*	1	
Mr. *Emerſon*, at *Hurworth*, County of *Durham*	1	Emerson
Mr. *John Buddle, Cheſter-lee-ſtreet*, near *Durham*	1	
Mr. *Iſaac Farrat*, at *Epſom*	1	
William Jones, M. D. near *Maidſtone, Kent*	2	
Captain *Thomas Simpſon, Whitby*	1	
Mr. *George Stapley*, at *Scots-Flot*, near *Rye*	1	

N: B. If any more Gentlemen have lately ſubſcribed, unknown to the Author, hey are deſired to ſend him Notice thereof, with their Names and Places of Abode.

, *Thoſe who pleaſe to be Contributors to the* Palladium *are deſired to direct their Letters* (franked or Poſt paid) *for the* Palladium *Author to be left at Mrs.* Sarah Halliax's, *at the* Dial and Fan, *in* Fleet-ſtreet, London; *except they are pleaſed to ſend heir Letters* (franked or Poſt paid) *directly to the Author.*

Long may *Britiſh Colours* fly on the Walls of *Quebec*,
And *Townſhend*'s* bold Stroke ſever Tyrant *Gallia*'s Neck!

*Which *General*, ſeizing the Opportunity, gave the finiſhing Stroke, in adding the mportant Empire of all *North America* to the Crown of *Great Britain*: bravely executing the *Plan* of the glorioſly fallen but *immortal General Wolfe*! when there was but a *ſmall Interval* betwixt the Repulſe of an *inferior* Army and the glorious Conqueſt of an important City, and depending Empire. — The Brave *Admiral Saunders*, and Sea-Forces, ſhared in the Glory of this Enterprize!

FINIS CORONAT OPUS.

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UNIVERSITY OF MICHIGAN

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